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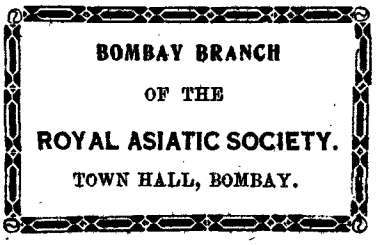

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THE

BRITISH MOTHS

AND

THEIR TRANSFORMATIONS

ILLUSTRATED IN A SERIES OF PLATES BY H. N. HUMPHREYS, ESQ.

WITH

CHARACTERS AND DESCRIPTIONS BY J. O. WESTWOOD, ESQ., F.L.S.

MEM. ENT. SOC. LONDON AND FRANCE; HON. AND CORR. MEM. NAT. HIST., AND OTHER SOCIETIES OF QUEBEC, BOSTON (U.S.), PENNSYLVANIA, STETTIN, MOSCOW, LUND, LILLE, LYONS, DUBLIN, PARIS, BELFAST, TORQUAY, RICHMOND, SHEFFIELD, ETC.

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REVISED AND CORRECTED BY THE AUTHOR

WILLIAM AND ROBERT CHAMBERS

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,,	7.	The Caterpillar.	
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,,	9.	The Caterpillar.	
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,,	12.	The Caterpillar.	
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,,	4.	The Caterpillar.	
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,,	7.	Petasia Cassinia (the Sprawler).	
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,,	10.	The Caterpillar.	
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,,	22.	Ligustrum vulgare (the common privet).	

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,,	4.	Cerura furcula (the Kitten-moth).	
,,	5.	The Caterpillar.	
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,,	9.	The Caterpillar.	
,,	10.	Cerura fuscinula.	
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,,	4.	The Caterpillar.	
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,,	24.	Briza media (common quaking-grass).	
,,	25.	Cetraria glauca (a common lichen).	

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,,	3.	The Caterpillar.	
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,,	5.	The Female.	
,,	6.	The Caterpillar.	
,,	7.	The Chrysalis.	
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,,	10.	The Female.	
,,	9.	The Caterpillar.	
,,	11.	Orgyia gonostigma, male (the scarce vapourer).	
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,,	16.	The Chrysalis.	

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,,	23.	Cratægus Oxyacanthus (the common hawthorn).	
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,,	2.	Stilpnotia Salicis (the satin-moth).	
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,,	8.	The Caterpillar.	
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,,	10.	The Female.	
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,,	13.	The Caterpillar.	
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,,	17.	Spilosoma lubricepeda (the spotted buff ermine).	
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,,	19.	A variety of S. lubricepeda, by some made a species, S. radiata.	
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,,	25.	Prunus spinosa (the sloe).	
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PLATE XIX. 92

INSECTS.	1.	Phragmatobia fuliginosa (the ruby Tiger-moth).	
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,,	4.	The Caterpillar.	
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,,	6.	The Caterpillar.	
,,	7.	A pale variety, a male.	
,,	8.	A dark and singular variety, a female.	
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,,	10.	The Caterpillar.	
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,,	12.	The Female.	
,,	13.	The Caterpillar.	
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,,	15.	The Caterpillar.	
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,,	17.	The Caterpillar.	
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,,	21.	The Caterpillar.	
,,	22.	Miltochrysta miniata (the red arches).	
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,,	24.	Plantago major (common plantain).	
,,	25.	Scabiosa arvensis (the meadow scabious).	
,,	26.	Senecio vulgaris (common groundsel).	
,,	27.	Cynoglossum officinale (common houndstongue). The white flower without a number is Cerastium arvense (field chickweed).	

PLATE XX. 98

INSECTS.	1.	Deiopeia pulchella (the crimson-speckled Footman-moth).	
,,	2.	The Caterpillar.	
,,	3.	Eulepia grammica (the feathered Footman).	
,,	4.	The Caterpillar.	
,,	5.	Eulepia cribrum.	
,,	6.	Lithosia flava (the straw-coloured Footman).	
,,	7.	Lithosia plumbeolata.	
,,	8.	Lithosia aureola (the orange Footman).	
,,	9.	The Caterpillar.	
,,	10.	Lithosia Griseola (the dun Footman).	
,,	11.	Lithosia Gilveola.	
,,	12.	The Caterpillar.	
,,	13.	Lithosia complana (the common Footman).	
,,	14.	Lithosia depressa.	
,,	15.	Lithosia helvola.	
,,	16.	Lithosia muscerda.	
,,	17.	Œnistis quadra (the large Footman), male.	
,,	18.	The Female.	
,,	19.	The Caterpillar.	
,,	20.	Gnophria rubricollis (the red-necked Footman).	
,,	21.	The Caterpillar.	
,,	22.	Philea irrorella (the Dew-moth).	
,,	23.	The Caterpillar.	
,,	24.	A singular variety, by some called S. signata.	
,,	25.	Cybosia mesomella (the four-spotted Footman).	
,,	26.	The Caterpillar.	
PLANTS.	27, 28.	Myosotis palustris (the Forget-me-not). Briza maxima (the great quaking-grass), is figured in the middle of the plate, with figure 16 represented upon it.	
,,	29.	Usnea florida (a common Lichen found on old trees).	
,,	30.	Parmelia stellaris (a common Lichen found on trunks of trees).	
,,	31.	Parmelia sinuosa (a common Lichen found on moor-stones).	

PLATE XXI. 106

INSECTS.	1.	Triphæna pronuba (the great yellow underwing moth).	
,,	2.	The variety called Innuba.	
,,	3.	A dark variety.	
,,	11.	The Caterpillar.	
,,	4.	Triphæna Orbona (the lesser yellow underwing).	
,,	12.	The Caterpillar.	
,,	5.	Triphæna subsequa.	
,,	6.	Triphæna fimbria (the broad-bordered yellow underwing).	
,,	7.	A dark variety.	
,,	13.	The Caterpillar.	

	FIG.		PAGE
INSECTS.	8.	Triphæna interjecta (the least broad border).	
,,	9.	Triphæna Janthina (the lesser broad border).	
,,	10.	Cerigo cytherea (the straw-coloured underwing).	
PLANTS.	15.	Tragopogon porrifolius (goat's-beard).	
,,	16.	Stellaria media (common chickweed).	
,,	14.	Primula elatior (the oxlip).	

PLATE XXII. 110

INSECTS.	1.	Lytæa umbrosa (the six-striped Rustic).	
,,	2.	Lytæa leucographa.	
,,	3.	Lytæa albimacula.	
,,	4.	Charæas Cespitis.	
,,	5.	The Caterpillar.	
,,	6.	Charæas fusca (the barred feathered Rustic).	
,,	7.	Charæas nigra (the black Rustic).	
,,	8.	Cerapteryx Graminis (the antler moth).	
,,	9.	Rusina ferruginea (the brown-feathered Rustic).	
PLANTS.	10.	Avena fatua (wild oat-grass).	
,,	11.	Briza media (common quaking-grass.	

PLATE XXIII. 114

INSECTS.	1.	Agrotis æqua (the pearly underwing).	
,,	2.	Agrotis suffusa (the dark sword-grass).	
,,	3.	Agrotis segetum (the common dart).	
,,	4.	The Caterpillar.	
,,	5.	A dark female variety.	
,,	6.	Agrotis corticea (the heart and club).	
,,	7.	Agrotis annexa, a female (the tawny shoulder).	
,,	8.	Agrotis cinerea, male (the light-feathered Rustic).	
,,	9.	The Female.	
,,	10.	Agrotis lunigera.	
,,	11.	Agrotis valligera (the Archer's dart).	
,,	12.	Agrotis radiola (the shuttle-shaped dart).	
,,	13.	Agrotis alpina.	
PLANT.	14.	Ranunculus bulbosus (the common crowfoot or buttercup).	

PLATE XXIV. 118

INSECTS.	1.	Agrotis subgothica (the gothic dart).	
,,	2.	Agrotis pascuea.	
,,	3.	Agrotis nebulosa, a female.	
,,	4.	Agrotis cursoria, a female.	
,,	5.	Agrotis Tritici (the white line dart).	
,,	6.	The supposed variety called sagittifera.	
,,	7.	Agrotis cuneigera (the wedge-barred dart).	
,,	8.	The Cumberland variety called venosa.	
,,	9.	Agrotis aquilina.	
,,	10.	Agrotis nigricans (the garden dart).	
,,	11.	The variety called obeliscata.	
,,	12.	The variety called dubia.	
,,	13.	Agrotis exclamationis (the heart and dart).	
,,	14.	The Caterpillar.	
,,	15.	Agrotis Marshallana.	
PLANT.	16.	Bellis Perennis (the common daisy).	

PLATE XXV. 124

INSECTS.	1.	Graphiphora subrosea.	
	2.	Graphiphora renigera, male.	
	3.	A Female.	
,,	4.	Graphiphora pyrophila.	
,,	5.	Graphiphora crassa (rorida?) (the stout dart).	
,,	6.	Graphiphora Augur (the double dart).	
,,	7.	The Caterpillar.	
,,	8.	Graphiphora Baja (the dotted clay).	
,,	9.	The Caterpillar.	
,,	10.	Graphiphora rhomboidea.	
,,	11.	Graphiphora brunnea (the purple clay).	
,,	12.	Graphiphora Dahlii (the barred chestnut).	
PLANTS.	13.	Atropa Belladonna (deadly nightshade).	
,,	14.	Polypogon littoralis (perennial beardgrass).	

PLATE XXVI. 128

INSECTS.	1.	Graphiphora festiva (the ingrailed clay).	
,,	2.	The Caterpillar.	
,,	3.	Graphiphora triangulum (the double square spot).	
,,	4.	Graphiphora C. nigrum (the setaceous Hebrew character).	
,,	5.	The Caterpillar.	
,,	6.	Graphiphora bella (the small square spot).	
,,	7.	Graphiphora plecta (the flame shoulder).	
,,	8.	The Caterpillar.	
,,	9.	Graphiphora lunulina, a female (the crescent-striped).	
,,	10.	Graphiphora musiva (the light-edged clay).	
,,	11.	The Caterpillar.	
,,	12.	Graphiphora candelisequa (the brown clay).	
,,	13.	The Caterpillar.	
,,	14.	Graphiphora depuncta.	
PLANTS.	15.	Cichorium Intybus (wild succory).	
,,	16.	Arrhenatherum arenaceum.	

PLATE XXVII. 132

INSECTS.	1.	Semiphora gothica (the Hebrew character).	
,,	2.	Orthosia instabilis (the clouded drab).	
,,	3.	A mottled variety.	
,,	4.	A dark variety.	
,,	5.	Orthosia intermedia (the connecting drab).	
,,	6.	Orthosia munda (the twin-spotted quaker).	
,,	7.	Orthosia lunosa (the lunar underwing).	
,,	8.	A dark variety.	
,,	9.	Orthosia gracilis (the lead-coloured drab).	
,,	10.	Orthosia pusilla (the dwarf quaker).	
,,	11.	Orthosia cruda (the small quaker).	
,,	12.	Orthosia Upsilon (the dingy shears).	
,,	13.	The Caterpillar.	
PLANT.	14.	Melica uniflora (wood melic grass).	

PLATE XXVIII. 136

INSECTS.	1.	Orthosia stabilis (the common quaker).	
,,	2.	Orthosia miniosa (the blossom underwing).	
,,	3.	The Caterpillar.	
,,	4.	Orthosia litura (the brown spot pinion).	
,,	5, 6, & 7.	Orthosia pistacina, three varieties (the pale headed chestnut).	
,,	8.	The Caterpillar.	
,,	9.	Orthosia macilenta (the yellow line quaker).	
,,	10.	Orthosia lota (the red line quaker).	

	FIG.		PAGE
INSECTS.	11.	Orthosia pallida (the pale quaker).	
,,	12.	Orthosia sparsa (the powdered quaker).	
PLANT.	13.	Cotabrosa aquatica (water whorl-grass).	

PLATE XXIX. 140

INSECTS.	1.	Mythimna Turca (the double line).
,,	2.	The Caterpillar.
,,	3.	Mythimna conigera (the brown line bright-eye).
,,	4.	The Caterpillar.
,,	5.	Mythimna grisea (the bright-eyed clay).
,,	6.	Mythimna lithargyria (the ochraceous brown).
,,	7.	The Caterpillar.
,,	8.	Mythimna imbecilla.
,,	9.	Segetia Xanthographa (the square spot rustic).
,,	10.	Segetia neglecta (the neglected rustic).
,,	11.	Caradrina Plantaginis (the dotted rustic).
,,	12.	The Caterpillar of Orthosia cruda (ambigua, Hübner, but not of Ochsenheimer, who describes Caradrina Plantaginis under that name).
,,	13.	Caradrina Morpheus (the bordered rustic).
,,	14.	The Caterpillar.
,,	15.	Caradrina cubicularis (the pale mottled willow).
,,	16.	Caradrina glareosa (the autumnal rustic).
,,	17.	Grammesia trilinea (the treble lines).
,,	18.	Grammesia bilinea (the dark treble lines).
,,	19.	The larva of Semiphora gothica, figured in plate 27.
,,	20.	The larva of Orthosia stabilis, figured in plate 28.
PLANTS.	21.	Convolvulus arvensis (the small bindweed).
,,	22.	Luzula pilosa (the hairy rush).
,,	23.	Plantago major (common plantain).

PLATE XXX. 146

INSECTS.	1.	Glæa? rubricosa (the red chestnut).
,,	2.	The Caterpillar.
,,	3.	Dasycampa rubiginea (the dotted chestnut).
,,	4.	The Caterpillar.
,,	5.	Glæa Vaccinii (the chestnut).
,,	6.	The Caterpillar.
,,	7.	Glæa subnigra (the black chestnut).
,,	8.	A variety.
,,	9.	Mecoptera satellitia (the satellite). The Caterpillar is represented at the right hand of the foot of the plate, crawling from beneath a leaf.
,,	11.	Amphipyra pyramidea (the copper underwing).
,,	12.	The Caterpillar.
,,	13.	Pyrophila tragopoginis (the mouse).
,,	14.	The Caterpillar.
,,	15.	Pyrophila tetra (the mahogany).
,,	16.	Dypterigia pinastri (the bird's wing).
,,	17.	Lemuris typica (the dark gothic).
,,	18.	The Caterpillar.
PLANTS.	19.	Rumex acutus (the sharp-leaved dock).
,,	20.	Delphinium consolida (the field larkspur).
,,	21.	Vaccinium Myrtillus (the bilberry).

PLATE XXXI. 152

INSECTS.	1.	Xylina conspicillaris (the silver cloud).
,,	2.	Xylina pulla (the ash shoulder-knot).
,,	3.	Xylina semibrunnea (the tawny pinion).
INSECTS.	4.	Xylina petrificata (the pale pinion).
,,	5.	Xylina putris (the flame).
,,	6.	Xylina Lambda (the grey shoulder-knot).
,,	7.	The Caterpillar.
,,	8.	Lithomia Solidaginis (the golden-rod brindle).
,,	9.	Calocampa exoleta (the sword-grass).
,,	10.	The Caterpillar.
,,	11.	Calocampa vetusta (the red sword-grass).
,,	12.	The Caterpillar.
PLANTS.	13.	Carex Vahlii (the close-headed Alpine carex).
,,	14.	Genista pilosa (hairy greenweed).

PLATE XXXII. 156

INSECTS.	1.	Xylophasia lithoxylea (the light arches).
,,	2.	Xylophasia sublustris (the reddish light arches).
,,	3.	Xylophasia polyodon (the dark arches).
,,	4.	Xylophasia rurea (the clouded bordered brindle).
,,	5.	Xylophasia combusta (the dark tawny).
,,	6.	Xylophasia characterea (the clouded brindle).
,,	7.	The Caterpillar.
,,	8.	Xylophasia scolopacina (the slender clouded brindle).
,,	9.	Xylophasia rectilinea (the clouded brocade).
,,	10.	The Caterpillar.
PLANT.	11.	Clematis vitalba (hedge clematis, or Traveller's joy).

PLATE XXXIII. 160

INSECTS.	1.	Hadena adusta (the dark brocade).
,,	2.	Hadena remissa (the gothic brocade).
,,	3.	Hadena thalassina (the pale-shouldered brocade).
,,	4.	Hadena genistæ (the light brocade).
,,	5.	Hadena contigua (the beautiful brocade).
,,	6.	The Caterpillar.
,,	7.	Hadena glauca (the glaucous shears).
,,	8.	The Caterpillar.
,,	9.	Hadena plebia (the common shears).
,,	10.	The Caterpillar.
PLANTS.	11.	Cypripedium calceolus (ladies' slipper).
,,	12.	Eriothorum vaginatum (hare's-tail cotton-grass).

PLATE XXXIV. 164

INSECTS.	1.	Hadena ochracea (the tawny shears).
,,	2.	Hadena Lithorhiza (the early grey).
,,	3.	Hadena Protea (the brindled green).
,,	4.	The Caterpillar.
,,	5.	Hadena Cucubali (the Campion moth).
,,	6.	The Caterpillar.
,,	7.	Hadena Capsincola (the Lychnis moth).
,,	8.	The Caterpillar.
,,	9 and 10.	Caterpillar when young.
,,	11.	Hadena Saponariæ (the bordered gothic).
PLANT.	12.	Lychnis inflata (Inflated Catchfly).

PLATE XXXV. 168

INSECTS.	1.	Heliophobus popularis (the feathered gothic).
,,	2.	Heliophobus leucophæus (the feathered ear).
,,	3.	The Caterpillar.
,,	4.	Euplexia lucipara (the small angle shades).

	FIG.		PAGE
INSECTS.	5.	The Caterpillar.	
,,	6.	Hama aliena (the large nutmeg).	
,,	7.	Hama Basilinea (the rustic shoulder-knot).	
,,	8.	The Caterpillar.	
,,	9.	Hama Testacea (the lesser-flounced rustic).	
,,	10.	Hama connexa (the union rustic).	
PLANT.	11.	Eriphorum Alpinum (Alpine cotton-grass).	

PLATE XXXVI. 172

INSECTS.	1.	Mamestra furva (the dusky brocade).
,,	2.	Mamestra Pisi (the broom-moth).
,,	3.	The Caterpillar.
,,	4.	Mamestra oleracea (the bright line brown-eye).
,,	5.	The Caterpillar.
,,	6.	Mamestra suasa (the dog's tooth).
,,	7.	Mamestra nigricans (the dusky nutmeg).
,,	8.	Mamestra Brassicæ (the Cabbage).
,,	9.	The Caterpillar.
,,	10.	Mamestra albicolon (the white colon).
,,	11.	Mamestra Persicariæ (the dot).
,,	12.	The Caterpillar.
,,	13.	Mamestra Chenopodii (the nutmeg).
,,	14.	The Caterpillar.
,,	15.	Mamestra Anceps? (the double nutmeg).
PLANTS.	16.	Lathyrus Nissolia (the crimson vetch).
,,	17.	Polygonum Persicaria (common Persicaria).

PLATE XXXVII. 176

INSECTS.	1.	Apamea fibrosa, male (the crescent).
,,	2.	A female variety.
,,	3.	Apamea nictitans (the golden ear).
,,	4.	A dark variety.
,,	5.	Apamea unanimis (the uniform rustic).
,,	6.	Apamea seculina (the small clouded brindle).
,,	7.	Apamea oculea (the common rustic).
,,	8 and 9.	Common varieties.
,,	10.	Apamea ophiogramma (the double-lobed).
PLANT.	11.	Iris fœtidissima (the fœtid Iris).

PLATE XXXVIII. 178

INSECTS.	1.	Miana literosa (the rosy minor).
,,	2.	Miana strigilis (the marbled minor).
,,	3.	The variety called Latruncula.
,,	4.	The variety called Æthiops (the blackamoor).
,,	5.	Miana humeralis (the cloaked minor).
,,	6.	A pale variety.
,,	7.	The variety called Terminalis.
,,	8.	A pale variety.
,,	9.	The variety called Rufuncula.
,,	10.	Miana fasciuncula (the middle-barred minor).
,,	11.	Miana Pulmonariæ.
,,	12.	Miana minima (the least minor).
,,	13.	Celæna renigera (the kidney-spot minor).
,,	14.	Celæna Haworthii (Haworth's minor).
,,	15.	The variety called Tripuncta.
,,	16.	The variety called Lancea, of which latter there is another still more obscure variety, called Hibernica.
PLANT.	17.	Peucedanum palustre (milk parsley).

PLATE XXXIX. 182

INSECTS.	1.	Lycophotia porphyrea (the true lover's knot).
,,	2.	The Caterpillar.
,,	3.	Achatia spreta (the pine beauty).
,,	4.	The Caterpillar.
,,	5.	Actebia præcox (the Portland moth).
,,	6.	Trachea atriplicis (the wild arrach).
,,	7.	The Caterpillar.
,,	8.	Valeria oleagina (the green-brindled dot).
,,	9.	The Caterpillar.
,,	10.	Miselia bimaculosa (the double-spot brocade).
,,	11.	Miselia Templi (the brindled ochre).
,,	12.	Miselia Oxycanthæ (the green-brindled crescent).
,,	13.	Miselia Aprilina (the marvel du jour).
,,	14.	The Caterpillar.
,,	15.	Miselia compta (the marbled coronet).
,,	16.	Miselia albimaculata (the white-spotted coronet).
PLANT.	17.	Erica tetralix (the cross-leaved heath).

PLATE XL. 188

INSECTS.	1.	Polia advena (the pale shiny brown).
,,	2.	Polia nebulosa (the gray arches).
,,	3.	The Caterpillar.
,,	4.	Polia occulta (the great brocade).
,,	5.	The Caterpillar.
,,	6.	Polia tincta (the silvery arches).
,,	7.	Polia herbida (the green arches).
,,	8.	The Caterpillar.
,,	9.	Polia flavocincta (the large ranunculus).
,,	10.	The Caterpillar.
,,	11.	Polia Dysodea (the ranunculus).
,,	12.	The Caterpillar.
,,	13.	Polia serena (the broad-barred white).
,,	14.	The Caterpillar.
,,	15.	Polia Chi (the July Chi).
PLANT.	16.	Aquilegia vulgaris (common columbine)

PLATE XLI. 192

INSECTS.	1.	Apatela Leporina (the miller).
,,	12 in Plate 42.	The Caterpillar.
,,	13 in Plate 42.	The Caterpillar when young.
,,	4.	Apatela Bradyporina (the ashy miller).
,,	5.	Apatela aceris (the sycamore).
,,	6.	A dark variety.
,,	17 in Plate 42.	The Caterpillar.
,,	8.	Bryophila glandifera (the marbled green).
,,	19 in Plate 42.	The Caterpillar.
,,	10.	Bryophila perla (the marbled beauty).
,,	11.	Dipthera Orion (the scarce marvel du jour).
,,	112 in Plate 42.	The Caterpillar.
,,	13.	Thyatira Batis (the Peach blossom).
,,	114 in Plate 42.	The Caterpillar.
,,	15.	Thyatira derasa (the buff arches).
,,	116 in Plate 42.	The Caterpillar.
,,	17.	Scoliopteryx libatrix (the herald).
,,	118 in Plate 42.	The Caterpillar.
PLANTS.	19.	Rosa canina (the common dog-rose).
,,	20.	Ligustrum vulgare (the common privet).

PAGE

PLATE XLII. 194

FIG.

INSECTS. 1. Acronycta ligustri (the coronet).
„ 112 in Plate 41. The Caterpillar.
„ 3. Acronycta alni (the alder-moth).
„ 114 in Plate 41. The Caterpillar.
„ 5. Acronycta Psi (the dagger-moth).
„ 116 in Plate 41. The Caterpillar.
„ 7. Acronycta tridens (the dark dagger).
„ 18 in Plate 41. The Caterpillar.
„ 9. Acronycta auricoma (the scarce dagger).
„ 101 in Plate 41. The Caterpillar.
„ 11. Acronycta menyanthedis (the light knot-grass).
„ 13. Acronycta Euphorbiæ (the spurge moth).
„ 141 in Plate 41. The Caterpillar.
„ 15. Acronycta Rumicis (the Bramble moth).
„ 121 in Plate 41. The Caterpillar.
„ 16. Acronycta megacephala (the poplar gray).
„ 142 in Plate 41. The Caterpillar.
PLANTS. 50. Menyanthes trifoliata (the Buck-bean).
„ 60. Rubus cæsius (the dewberry).

PLATE XLIII. 202

INSECTS. 1. Ceratopacha fluctuosa (the satin carpet).
„ 2. Ceratopacha duplaris (the lesser satin carpet).
„ 3. Ceratopacha diluta (the lesser lutestring).
„ 4. The Caterpillar.
„ 5. Ceratopocha Or (the poplar lutestring).
„ 9. The Caterpillar.
„ 6. Ceratopacha octogesima.
„ 7. Ceratopacha flavicornis (the yellow-horned).
„ 8. The Caterpillar.
„ 9. Ceratopacha ridens (the frosted green).
„ 10. The Caterpillar.

PLATE XLIV. 204

INSECTS. 1. Plastenis subtusa (the olive moth).
„ 4. The Caterpillar.
„ 3. Plastenis retusa (the double kidney).
„ 2. The Caterpillar.
„ 5. Cleoceris viminalis (the minor shoulder-knot).
„ 6. Cleoceris Oo (the scallop-winged oak-moth).
„ 7. The Caterpillar.
„ 8. Cosmia Pyralina (the lunar spotted pinion).
„ 9. The Caterpillar.
„ 10. Cosmia diffinis (the white spotted pinion).
„ 11. The Caterpillar.
„ 12. Cosmia affinis (the lesser spotted pinion).
„ 13. Cosmia Trapezina (the dun bar).
„ 14. Cosmia fulvago (the angle striped sallow).

PLATE XLV. 208

INSECTS. 1. Xanthia flavago (the pink-barred sallow).
„ 2. The Caterpillar.
„ 3. Xanthia fulvago (the sallow).
„ 4. A more strongly-marked variety.
„ 5. Xanthia aurago (the barred sallow).

FIG. PAGE

INSECTS. 6. Xanthia centrago (the centre barred sallow).
„ 7. Xanthia citrago (the orange).
„ 8. The Caterpillar.
„ 9. Xanthia croceago (the orange upper wing).
„ 10. The Caterpillar.
„ 11. Orbona rufina (the flounced rustic).
„ 12. The Caterpillar.
„ 13. Orbona ferruginea (the brick-coloured moth).
„ 14. Gortyna micacea (the rosy rustic).
„ 15. The Caterpillar.
„ 16. Gortyna flavago (the frosted orange).
„ 17. The Caterpillar.

PLATE XLVI. 212

INSECTS. 1. Nonagria Typhæ (the bulrush moth).
„ 2. A Female.
„ 3. The Caterpillar.
„ 4. Nonagria Pilicornis (the large wainscot).
„ 5. A Female.
„ 6. A variety called Crassicornis.
„ 7. A Female.
„ 8. A variety with dark under-wings.
„ 9. A variety resembling the N. lutosa of Hübner.
„ 10. A variety called Cannæ.
„ 11. The continental Cannæ.
„ 12. The Caterpillar of Cannæ.

PLATE XLVII. 214

INSECTS. 1. Leucania straminea (the southern wainscot).
„ 2. Leucania comma (the shoulder-stripe wainscot).
„ 3. Leucania impura (the smoky wainscot).
„ 4. The Caterpillar.
„ 5. Leucania obsoleta (the obscure wainscot).
„ 6. Leucania littoralis (the shore wainscot).
„ 7. Leucania pallens (the common wainscot).
„ 8. Leucania suffusa (a variety of pallens).
„ 9. Leucania pygmina (the small wainscot).
„ 10. Leucania pallida, (a variety of pygmina).
„ 11. Leucania gemini puncta (the twin-spotted wainscot).
„ 12. The Caterpillar.
„ 13. Leucania pudorina (the striped wainscot).
„ 14. The Caterpillar.
„ 16. Leucania Phragmatidis (the Simyra musculosa of some British collections).
PLANT. 15. Eriophorum angustifolium (narrow-leaved cotton-grass).

PLATE XLVIII. 220

INSECTS. 1. Simyra musculosa of some collections (properly Leucania Phragmatidis). See Plate XLVII., fig. 16.
„ 2. Leucania musculosa of the Continent.
„ 3. Simyra nervosa (the tawny-veined wainscot).
„ 4. Simyra venosa (the powdered wainscot).
„ 5. Phlogophora meticulosa (the angle shades).
„ 6. The Caterpillar.
„ 7. Cucullia Verbasci (the mullein).

	FIG.	PAGE
INSECTS.	8. The Caterpillar.	
,,	9. Cucullia Scrophulariæ (the water betony).	
,,	10. The Caterpillar.	
,,	11. Cucullia thapsiphaga (the shepherd's purse).	
,,	12. The Caterpillar.	
,,	13. Cucullia Lychnitis.	
,,	14. The Caterpillar.	
,,	15. Cucullia Prenanthis.	
PLANT.	16. Verbascum pulverulentum (the powdered mullein).	

PLATE XLIX. 224

INSECTS.	1. Cucullia Solidaginis (the shepherd's purse).	
,,	2. The Caterpillar.	
,,	3. Cucullia Asteris (the starwort).	
,,	4. The Caterpillar, in which some varieties have the pink tint replaced with green.	
,,	5. Cucullia Absinthii (the wormwood).	
,,	6. Cucullia umbratica (the large pale shark).	
,,	7. The Caterpillar.	
,,	8. Cucullia Tanaceti (the tansy shark).	
,,	9. The Caterpillar.	
,,	10. Cucullia Lactucæ (the lettuce shark).	
,,	11. The Caterpillar.	
,,	12. Cucullia lucifuga (the large dark shark).	
,,	13. The Caterpillar.	
,,	17. The Chrysalis.	
,,	14. Cucullia Chamomillæ (the chamomile shark)	
,,	15. The Caterpillar.	
,,	16. Cucullia Artemisiæ (the green silver spangle).	
PLANT.	18. Aster tripolium (the sea starwort).	

PLATE L. 226

INSECTS.	1. Charicles Delphinii (the pease-blossom).	
,,	2. The Caterpillar.	
,,	3. Calophasia Linariæ (the flax-moth).	
,,	4. The Caterpillar.	
,,	12. The Chrysalis.	
,,	5. Eremobia ochroleuca (the dusky sallow).	
,,	6. Abrostola triplasia (the dark spectacle).	
,,	7. The Caterpillar.	
,,	8. Abrostola Urticæ (the spectacle).	
,,	9. The Caterpillar.	
,,	10. Abrostola Asclepiadis.	
,,	11. The Caterpillar.	
PLANT.	13. Linaria repens (the creeping toad-flax).	

PLATE LI. 228

INSECTS.	1. Cloantha perspicillaris.	
,,	2. Plusia illustris (the purple shades).	
,,	3. The Caterpillar.	
,,	4. Plusia percontationis (the plain golden Y).	
,,	5. Plusia bimaculata (the double spotted spangle).	
,,	6. Plusia interrogationis (the scarce silver Y).	
,,	7. Plusia Gamma (the silver Y).	
,,	8. The Caterpillar.	
,,	9. Plusia Festucæ (the gold spot).	
,,	10. The Caterpillar.	
,,	11. The Caterpillar of Plusia circumflexa.	
,,	12. The Caterpillar of Plusia chrysitis.	
PLANTS.	13. Festuca fluitans (fescue grass).	
,,	14. Aconitum napellus (monkshood).	

PLATE LII. 230

INSECTS.	1. Plusia Iota (the beautiful golden Y).	
,,	2. The Caterpillar.	
,,	3. Plusia circumflexa (the Yorkshire Y). The Caterpillar is figured in Plate LI.	
,,	4. Plusia Chalcytis.	
,,	5. Plusia aurifera (the slender burnished brass).	
,,	6. Plusia chrysitis (the burnished brass). The Caterpillar is figured in Plate LI.	
,,	7. Plusia orichalcea (the scarce burnished brass).	
,,	8. Plusia bractea (the gold spangle).	

PLATE LIII. 234

INSECTS.	1. Heliothis marginata (the bordered sallow).	
,,	2. Heliothis peltigera (the bordered straw).	
,,	3. The Caterpillar.	
,,	4. Heliothis dipsacea (the marbled clover).	
,,	5. Heliothis scutosa (the spotted clover moth).	
,,	6. The Caterpillar.	
,,	7. Anarta Myrtilli (the beautiful yellow underwing).	
,,	8. Anarta cordigera (the small dark yellow under wing).	
,,	9. Anarta vidua? (the dark yellow underwing).	
,,	10. Heliodes heliaca (the small yellow underwing).	
,,	11. Acontia luctuosa (the four-spotted).	
,,	12. Acontia aprica (the nun).	
,,	13. Acontia solaris (the pale shoulder).	
,,	14. Acontia caloris (the marbled beauty).	
,,	15. Hydrelia uncana (the silver hook).	
,,	16. Agrophila sulphuralis (the spotted sulphur).	
,,	17. Hydrelia Bankiana (the silver barred).	
,,	18. Erastria venustula (the rosy marbled).	
,,	19. Erastria minuta of Hübner.	
,,	20. Micra minuta of Haworth (the small marbled).	
,,	21. Micra ostrina (? purpurina) (the purple marbled).	
,,	22. Erastria apicosa (the blossom tip.)	
,,	23. Erastria fuscula (the white spot marbled).	
,,	24. The Caterpillar.	
,,	25. Erastria albilinea (the white line marbled).	

PLATE LIV. 240

INSECTS.	1. Euphasia catena (the Brixton beauty).	
,,	2. Phytometra ænea (the small purple barred).	
,,	3. Acosmetia lutescens (the reddish buff).	
,,	4. Acosmetia caliginosa (the dingy).	
,,	5. Acosmetia rufa (the small rufous).	
,,	6. Acosmetia lineola (the lineated rufous).	
,,	7. Acosmetia arcuosa (the small dotted buff).	

	FIG.		PAGE
INSECTS.	8.	Stilbia anomalata (the anomalous).	
,,	9.	The Female.	
,,	10.	Ophiusa lusoria (the black neck).	
,,	11.	The Caterpillar.	
,,	12.	Acosmetia Morrisii.	

PLATE LV. 246

INSECTS.	1.	Mormo Maura (the old lady, or great brown bar).	
,,	2.	The Caterpillar.	
,,	3.	Catocala Fraxini (the Clifden nonpareil).	
,,	4.	The Caterpillar.	
,,	5.	Catocala nupta (the red underwing).	
,,	6.	Catocala elocata.	
PLANT.	7.	Alnus glutinosa (the common alder).	

PLATE LVI. 249

INSECTS.	1.	Catocala sponsa (the dark crimson underwing).	
,,	2.	The Caterpillar.	
,,	3.	Catocala promissa (the light crimson underwing).	
,,	15.	The Caterpillar.	
,,	4.	Catocala conjuncta (the lesser crimson underwing).	
,,	5.	Brepha Parthenias (the orange underwing).	
,,	6.	The Caterpillar.	
,,	7.	Brepha notha (the light orange underwing).	
,,	8.	The Female.	
,,	9.	The Caterpillar.	
,,	10.	Euclidia Glyphica (the Burnet).	
,,	11.	Euclidia Mi (the Shipton).	
,,	12.	The Caterpillar.	
PLANT.	13.	Quercus pedunculata (common oak).	

PREFACE.

In commencing the study of insects, the order *Lepidoptera*, containing the beautiful tribes of Butterflies, Sphinges, and Moths, seldom fails to attract the earliest attention of the naturalist. When first I began to collect insects myself, my rambles in the fields and woods were confined to the day, and in the mid-day sunshine Butterflies were the most conspicuous objects, and to that division consequently my first labours of illustration were directed. But as I became more acquainted with the night-flying tribes of this beautiful class of insects, I became still more interested in the Moths. The British Moths are not perhaps so gaily coloured as their more gaudy rivals, the butterflies; but when we consider the splendid sphinges, or twilight fliers, by which they are linked to the day-flying butterflies, they can scarcely be deemed less beautiful. Indeed, in the larva stage, many moths surpass in their wonderful raiment of velvet and satin, of ermine and sable, jewelled over with gold and silver studs of various metallic tints, anything which the butterfly division can boast; and the careful portraiture of these truly magnificent caterpillars will form a principal feature in the present work. The gorgeous colouring and texture of the caterpillar frequently disappear in the perfect moth; but are replaced by intricate and graceful pencillings, and wonderfully elegant and varied markings, which amply repay the loss of glowing tints.

But the moths are infinitely more interesting to the collector on account of their numbers, in which they greatly exceed the butterflies, and which will oblige me in the present work frequently to give as many as twenty species upon a single plate; a labour which I shall cheerfully undertake, in order to produce a more complete, and at the same time more accessible work than has hitherto appeared upon the subject; for in order to make it equally popular and attainable by all classes, it will be published at the same low price as the butterflies, notwithstanding the great increase of labour and expense attendant upon its production.

The occupation of forming a collection of moths is more interesting than is the case with butterflies, inasmuch as with the former many ingenious stratagems may be employed with the greatest success; whilst, with the latter, watching for the insect in the broad sunshine, and capturing it by sheer dexterity of hand and speed of foot, is the only practicable mode of operation. Stratagem is certainly much more interesting than this obvious mode of proceeding; for instance, when all appears utterly still in the

insect world, on a balmy night of summer or autumn, the collector, by placing a light near his open window, may ensure the appearance of a variety of moths; indeed on a favourable night they will follow each other in almost uninterrupted succession, from dusk to dawn, attracted by the treacherous beacon, to their capture. And how interesting is it to the naturalist to watch the punctuality with which each nightly traveller, or set of travellers, keeps to fixed and stated hours of flight; every period of the night having its peculiar visitants; so that a clock of moths may be imagined, as Linnæus formed a dial of flowers.*

Many other methods of attracting moths may be adopted with equal success. A female moth, taken into the fields or woods, which the species is likely to frequent, will generally attract many males to the spot where she is placed. I have known many beautiful specimens of the Emperor moth captured within the short space of half an hour by this method. Mr. Doubleday has recently tried the experiment of brushing a mixture of sugar and water upon the bark of trees where moths are likely to abound, and found the plan perfectly successful, having captured immense numbers this season in that way, many of them of the most rare and beautiful species. And an ingenious collector, by studying nature and closely examining the habits of the insects, may adopt many other modes equally, or perhaps more, successful.

I had originally intended forming a separate work of the Sphinges; but, finding them not sufficiently numerous, I have determined to give them with the Moths, of which work they will occupy a few of the early numbers.

H. N. H.

October, 1841.

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* From the early-expanding convolvulus to the evening primrose and night-flowering cereus a clock may be formed, which would indicate the time by the opening of a flower, instead of the striking of a bell.

BRITISH MOTHS

AND

THEIR TRANSFORMATIONS.

ORDER LEPIDOPTERA.

SECTION II.—HETEROCERA.

THE distribution of this beautiful order of insects into three primary groups, Papilio, Sphinx, and Phalæna, by Linnæus, which correspond with Latreille's sections, Diurna, Crepuscularia, and Nocturna, has been alluded to in the introductory portion of our former volume, in which—as it was at first intended that the first two groups should be comprised therein—it appeared advisable to retain the divisions Crepuscularia and Nocturna, whereby the subjects of the first volume would have maintained a nominal distinction from those treated on in the subsequent part of the work. As, however, the plan of the work has been altered so as to comprise the butterflies alone in the first volume, I am enabled with less difficulty to adopt the distribution of M. Boisduval; by whom the order is divided into only two primary divisions; the first, or Rhopalocera, composed of the butterflies, or the section Diurna; and the second, or Heterocera, comprising both the Crepuscularia and Nocturna, or the hawk-moths (genus Sphinx, Linnæus), and moths (genus Phalæna, Linnæus).

On referring to the "Systema Naturæ," we find the formation of the antennæ and the period of flight to constitute the only distinctive characters to separate the two last-mentioned tribes, the antennæ in Sphinx being attenuated at each extremity, and subprismatical in form, whilst in Phalæna they were described as setaceous, or gradually attenuated from the base to the extremity. The flight of Sphinx, on the other hand, is described as being either in the morning or evening, whilst that of the Phalæna is nocturnal. Now these characters are clearly insufficient to separate the two groups. Many of the species belonging to the Linnæan genus Sphinx, for example, have not prismatical antennæ thickened at the middle, whilst a great number of them fly in the hottest sunshine. Again, many Phalæna have antennæ similar to those of many Sphinges, and their flight, as every entomological tyro knows, who has ever been out at dusk "*mothing*," is during the twilight: but the more generalised views entertained by modern naturalists, who found their distributions, not upon an isolated character, but upon the entire character of an animal, derived from *all* its peculiarities, lead us to the certain conviction that

in other and more essential respects, namely in the structure of the mouth, wings, and especially in the transformations of the insects composing these two Linnæan groups, there is still less distinction between them. In other words, the characters employed by Linnæus are thus proved to possess less value than he assigned to them. Acting upon these considerations, Dr. Horsfield and Messrs. Newman and Stephens have respectively proposed plans of arrangement, in which the group Crepuscularia is retained, and the genus Phalæna divided into several primary groups, each of which is regarded as equivalent in value to the Diurna; Mr. Stephens's groups being named Diurna, Crepuscularia, Pomeridiana, Nocturna, Semidiurna, and Vespertina. My objection to these arrangements is, that whilst the Diurna constitute an admirably distinct tribe, it is impossible to point out another group similarly defined throughout the order. Looking for a moment at the Crepuscularia, or hawk-moths, as thus restricted, we have antennæ of diversified form; flight in the hottest sunbeams as well as in the twilight; wings of varied forms and powers of flight; proboscis much longer than the body in some, and wanting in others; and transformations various; whilst it is almost impossible to draw the line of distinction between some of the Smerinthi and certain North American Bombycidæ, between Urania and some of the giant Noctuidæ, Ægeria and the Hepialidæ, Anthrocera and some Bombycidæ. It is, however, more especially amongst the exotic species that we find this difficulty, where the chain of relation between the Crepuscularia and Arctiidæ, as well as other tribes, is almost unbroken. The same remark may be almost as fully made respecting any of the other groups into which the Linnæan Bombyces are divided by these authors.

I consequently consider it will be more advantageous, at least until we possess more precise materials for a general classification of the order*, to unite the Linnæan Sphinges and Phalæna into one primary section—that of the HETEROCERA, *Boisd.*—named from the diversified structure of the antennæ, which are never terminated by a club, like those of the butterflies, but are generally setaceous, filiform, or fusiform; those of the males being, moreover, often furnished with more or less developed lateral, bristle-like appendages forming branches; the wings are ordinarily furnished with the spring and socket apparatus for retaining them together during flight; the caterpillars are extremely varied in form, colours, clothing, &c.; but the *pupæ* are generally of a *conical form*, without angular projections, and they are ordinarily enclosed in a cocoon of varied construction, the quiescent state being often undergone in the ground.

It will easily be conceived from the preceding remarks, that if the question of the primary divisions of the Lepidoptera be unsettled, that of the family groups cannot be better determined. As, however, the discussion of these questions would occupy too great a space in the present work, I must refer the student to the second volume of my Introduction to the Modern Classification of Insects, in which I have entered upon it at some length. Admitting as I do, my inability to offer a satisfactory distribution of the Heterocera into primary groups, I have in that work proposed the following series of secondary groups or families, and which I shall adopt in the following pages:—1. Sphingidæ; 2. Uraniidæ; 3. Anthroceridæ; 4. Ægeriidæ; 5. Hepialidæ; 6. Bombycidæ; 7. Arctiidæ (including the Notodontidæ of Stephens); 8. Lithosiidæ; 9. Noctuidæ; 10. Geometridæ; 11. Pyralidæ; 12. Tortricidæ; 13. Yponomeutidæ; 14. Tineidæ; and 15. Alucitidæ. The second of these families consists entirely of exotic insects, and will require no further notice in the present work.

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* Mr. Swainson well observes that "so little has been done towards the philosophic investigation of these groups, that whilst their genera have been multiplied and are daily multiplying in the artificial systems of the day, the study of their affinities has been of late years much neglected."

FAMILY I.
SPHINGIDÆ.

This family (with which I unite the Sesiidæ* of Mr. Stephens) comprises the most robust and powerful insects in the order, being generally distinguished by their large size, and the strength and peculiarity of their hawk-like flight, whence their English name Hawk-moths. The spiral tongue, or maxillæ, is often extremely long, exceeding the whole body in length in some species; the antennæ are prismatic, and terminated by a minute feather or thread; the labial palpi are broad and compressed, and closely covered with scales, the terminal joint being generally almost obsolete; the maxillary palpi are minute and three-jointed; the body long, and acute behind; the wings, especially the hinder pair, small; the caterpillars naked, cylindrical, and sixteen-footed, and generally furnished with a dorsal horn near the extremity of the body; they are also almost invariably ornamented with pale oblique stripes upon the sides of the body. They generally descend into the earth to become pupæ, which are naked, conical, and often furnished with a detached horn, containing the spiral tongue, extending beneath the breast; this is, however, wanting in those typical species which have the spiral tongue short. The wings are retained in their situation during flight by the spring and socket apparatus. Various modifications occur in the different members of this family, which it will be unnecessary here to mention, as they will be noticed in the account of the different genera. The interesting connexion which exists between the variation in the length of the spiral tongue and the rapidity of flight merits attention, depending as it does on the habit of the insects of extracting the nectareous juices of tube-bearing flowers by means of their elongated proboscis.

The caterpillars of the typical species are remarkable for the attitude which they ordinarily assume, whence they have obtained the name of Sphinx, from their supposed resemblance to the figures of that fabulous creature; others are distinguished for the faculty which they possess of elongating and contracting the three anterior segments of the body, giving them somewhat the appearance of the probòscis of an elephant, whence they have obtained the name of Elephant-sphinxes. These and some other of the caterpillars undergo their transformations in a leaf cocoon on the surface of the ground; the majority, however, descend to a considerable distance into the earth, where they form an oval cell.

On casting our eyes over a collection of these insects, it is impossible not to be convinced that the pre-eminent characteristics of the group are to be found in the powerful flight and great elongation of the spiral proboscis; indeed the vulgar name of hawk-moths amply proves that the common observation of their habits has fixed upon their most prominent character. Now this peculiarity does not exist in the death's-head moth, which, although the giant of our British species, cannot on that account alone be regarded as "at the head of this tribe." It is true that Mr. Swainson (in order to support his fanciful theory, that one of the primary divisions of all groups is "a type of evil,") has found in this insect a fit object for such pre-eminence, as it carries upon its thorax the

* Mr. Stephens established this family on account of the tufted abdomen, diurnal flight, and location of the cocoon on the surface of the ground; but such characters are too trivial to warrant the establishment of families thereon. Mr. Swainson's family Orthidæ, composed of the elephant hawk-moths, Sesiæ, Ægeriæ, &c., is as artificial a group as could well be devised.

"sign and seal of the symbol which Nature designed it to be" in the figure of the human skull, the emblem of death and of the grave; whilst the "threatening attitudes" of the caterpillars, and the great depth at which they bury themselves in order to become chrysalides (on the way to the infernal regions), form additional claims to the pre-eminental evil character of the family! We may admire the skill with which this author seizes upon these various circumstances in support of his theory; but we cannot admit the Sphinx Atropos to be the type of the family, and consequently we must consider the new generic name given to this insect as an advantage, and that the name Sphinx has been correctly retained for the species which represent the family much more naturally than *it* can be considered as doing.

I therefore place the typical genus Sphinx in the middle of the family which is commenced and terminated by less typical species, which exhibit the characters of, and thus point the way to, other groups.

DESCRIPTION OF PLATE I.

INSECTS.—Fig. 1. Smerinthus Ocellatus (the eyed Hawk-moth). 2. The Caterpillar. 3. The Chrysalis.
" Fig. 4. Smerinthus Populi (the poplar Hawk-moth). 5. The Caterpillar. 6. The Chrysalis.
" Fig. 7. Smerinthus Tiliæ (the lime Hawk-moth). 8. The Caterpillar. 9. The Chrysalis.
" Fig. 10. A hybrid between Smerinthus Ocellatus and Smerinthus Populi.

PLANTS.—Fig. 11. Pyrus malus (the wild apple, or crab-tree).
" Fig. 12. Tilia Europæa (the lime).
" Fig. 13. Populus nigra (the black poplar).

The insects in this plate are all from fine specimens in the British Museum. Smerinthus Populi is from a remarkably fine female specimen, which I selected for its size and perfect preservation; it is lighter in colour than most males, the dark markings of which are generally stronger and less inclined to tawny. The caterpillar and chrysalis are from Godart and Hübner. H. N. H.

GENUS I.

SMERINTHUS, LATREILLE. (LAÖTHOË, FABRICIUS).

This is a very distinct and natural group, distinguished by the very sluggish habits of the perfect insect, in which the body is short, stout, and conical, the wings moderately long, the anterior angulated or dentated along the outer margin; when at rest they form a triangle; the posterior pair projecting beyond the sides of the upper. The spiral tongue is exceedingly short, being in fact scarcely longer than the palpi, so that the insect is obliged to settle upon flowers to take what little nourishment it requires. The antennæ are but slightly prismatic, being serrated, or rather strongly setose, in the males, whilst in the females they are slender and scaly. The apex does not terminate in a feathered seta. The caterpillars are distinguished at once by their granulated appearance, the entire surface of the body being covered with minute tubercles, arranged in transverse series. The head is also of a conical, or heart-shaped form, the point being upwards; the body is terminated above by a nearly straight horn; they enter the ground to undergo the pupa state, which is rough and conical, terminated by an acute point, the head cap being destitute of the prominent tubular case containing the proboscis, which is in fact too short to require any such defence. The flight of the perfect insects is quite unlike that of the typical Sphingidæ, being slow and heavy, like that of the Bombycidæ.

The species of this genus are few in number, and of moderate size. They appear to be subject in a remarkable degree to gynandromorphism, a considerable number of instances of this kind having been recorded by different authors, which I have collected in a memoir read before the Entomological Society of London; in which I have also described and figured some very interesting individuals reared by Mr. House, being hybrids between S. ocellatus and S. populi, which are the only instances hitherto recorded of a similar result produced by the forced union of the sexes of distinct species. One of these is represented in our Plate I. fig. 10, partially exhibiting the dentated margin of the wing, and the reddened base of the hind wings of the latter species, and an incipient eye-like spot, as in S. ocellatus.

SPECIES 1.—SMERINTHUS OCELLATUS. THE EYED HAWK-MOTH.

Plate i. fig. 1—3.

SYNONYMES.—*Sphinx ocellatus*, Linnæus, Donovan, Brit. Ins. vol. 8, pl. 269. Albin, pl. 8. Harris, Aurelian, pl. 5. f. a—i. Wilkes, pl. 24.

Smerinthus ocellatus, Latreille. Curtis, Brit. Ent. pl. 462. Wood, Ind. Ent. pl. 4, fig. 7. Duncan, Brit. Moths, pl. 3, fig. 1.
Sphinx salicis, Hübner, pl. 15, fig. 23.
Paonias salicis, Hübn. (Verz. bek. Schm.)

This handsome insect varies in the expanse of its wings from 2¾ to nearly 3¾ inches. The fore wings are of a pale rosy ash colour, variegated with chocolate brown, a large patch internally angulated being placed in the middle, and extending to the hind margin; between this and the extremity of the wings are several undulated brown bars, and the extremity is also brown, the apex itself being pale. The hind wings are of a fine rose-pink colour, gradually shaded off to grey along the margin, and marked near the anal angle with a large black spot, in which is a pale blue ocellus, the middle being of a slaty black hue. The fore wings have the posterior margin almost entire, with the exception of a rather deep sinus near the hinder angle, giving the wings an angulated appearance; the hind wings are also almost entire, with the anal angle slightly produced. The thorax is marked above with a large patch of chocolate brown.

The caterpillar is very pale green, with the minute tubercles and eight oblique white bars on each side, while the spiracles are of a rosy brown colour, and the head is bordered with yellow. It chiefly feeds upon the willow and sallow, but is occasionally found on the apple, sloe, peach, and almond. It appears in the autumn, and changes to a chrysalis in September, and the moth bursts forth to life at the end of the following May. It is widely distributed throughout England, and is by no means rare; although in Scotland it is very seldom met with.

SPECIES 2.—SMERINTHUS POPULI. THE POPLAR HAWK-MOTH.

Plate i. fig. 4—6.

SYNONYMES.—*Sphinx Populi*, Linnæus, Haworth, Donovan, 7, pl. 241. Albin, pl. 57. Wilkes, pl. 25. Harris, Aurelian, pl. 33, fig. a—g.

Smerinthus Populi, Latreille; Stephens; Wood, Ind. Ent. t. 4, f. 9. Duncan, Brit. Butt. pl. 3, fig. 2.
Laöthoë Populi, Fabricius, Leach.
Polyptychus Populi, Hübner (Verz. bek. Schmet.)

The expansion of the wings varies from three to nearly four and one-third inches. They are of a pale lilac-grey, with a broad central bar succeeded by several undulated stripes, and the extremity of a greenish-brown, the first being much darker towards the hind margin of the wings; the veins, and especially the oblique vein closing the discoidal cell, pale whitish; the base of the hind wings is broadly ferruginous. All the wings have the apical margin almost regularly scolloped, and the anal angle of the hind wings is scarcely produced: the thorax and abdomen are entirely of a pale lilacy-grey. The males have the markings of the fore wings generally darker

than the females; others are very pale, and Mr. Curtis mentions a variety in which the hind wings are destitute of the brick-red patch.

The caterpillar is pale green, very much shagreened with minute white tubercles, and having a whitish or pale-yellow line on the anterior segments, and an oblique one of similar colour upon each of the succeeding segments, the last of which terminates at the base of the tail. The spiracles and membranous feet are pale red, and frequently each segment is ornamented with a large red spot, and the sides of the head with a narrow yellow line, which meet upon the crown.

The caterpillar is found at the beginning of the autumn, and feeds on the willow, poplar, and aspen. It goes underground to assume the chrysalis state, which is of a dull-brown colour. The moth appears at the end of June, the middle of August, and even in September; in the latter case, the specimens have undergone pupation rather earlier than usual, whereas the majority pass that state in the winter.

This species is, perhaps, the most abundant of our British Sphingidæ. It occurs throughout England and the south of Scotland. It is perhaps on this account that so many instances of gynandromorphism have been observed in individuals of this species, in some of which the wings and antennæ on the right side are male, and those on the left female, as perfectly as if a male and female had been divided lengthways, and the halves of the opposite sexes united.

SPECIES 3.—SMERINTHUS TILIÆ. THE LIME HAWK-MOTH.

Plate i. fig. 7—9.

SYNONYMES.—*Sphinx Tiliæ*, Linnæus; Haworth; Donovan, vol. 10, pl. 325. Albin, pl. 10. Wilkes, pl. 23. Harris, Aurelian, pl. 20, fig. a—g. Sepp. Ins. v. 1, 2, t. 6. | *Smerinthus Tiliæ*, Latreille, Stephens, Wood, Ind. Ent. t. 4. f. 8. Duncan, Brit. Butt. pl. 4, f. 1. *Minias Tiliæ*, Hübner (Verz. bek. Schm.)

This handsome species varies from rather more than two to about three inches in the expanse of the wings, of which the anterior have the base and disc of a greyish or rosy grey, the centre being marked with a broad bar formed of two large olive-brown patches; the extremity of the wing is broadly olivaceous, the apex of the anterior margin being marked with a white or pale buff angulated spot; the hind wings are reddish grey, having broad oblique dull-brown bar towards the outer margin, which terminates in a gradually-blackened spot at the anal angle; the fore wings have the apical margin deeply and irregularly incised; and there is a deep scollop near the anal angle of the hind wings; the body is whitish brown or ash-coloured, the thorax having three olivaceous stripes, which meet on the neck. There are several varieties, not only in the ground colour of the wings, but in the size and form of the discoidal patches; and specimens occasionally occur with markings on the opposite wings dissimilar.

The caterpillar is granulated, and attenuated in front; of a green colour, with several oblique whitish stripes on each side, margined with reddish or yellow in front; the tail is of moderate length, and there is a granular protuberance over the anus; the head, also, is comparatively small. The chrysalis is reddish brown and rough; it is found underground.

This species is found in the neighbourhood of lime-trees and elms, upon which the caterpillar chiefly feeds; it is, however, occasionally found on the alder, birch, and oak, appearing in this state at the end of the summer, and the moth coming forth in the following May, but sometimes not until July and August.

It is comparatively rare; although not unfrequently found near London: it seems, however, to become very uncommon in the north of England, and not to occur at all in Scotland.

DESCRIPTION OF PLATE II.

INSECTS.—Fig. 1. Acherontia Atropos (the death's-head Hawk-moth). 2. The Caterpillar. 3. The Chrysalis.

PLANTS.—Fig. 4. Jasminum officinale (the common jasmine or jessamine).

" Fig. 5. Solanum dulcamara (the bittersweet or woody nightshade).

The insect figured in this plate is from a very large specimen in the British Museum. I have represented the larva feeding upon the Solanum dulcamara, as an indigenous British plant nearly allied to the potato, which is its favourite food, but which, being an important plant, I did not consider so appropriate in the present work. I have, however, varied the plate with another plant, which, though also imported, is much more ornamental than the potato; this is the Jasminum officinale, upon which the larvæ are not unfrequently found. The larva is from the excellent figure of Godart. H. N. H.

ACHERONTIA, OCHSENHEIMER. (BRACHYGLOSSA, BOISDUVAL.)

This genus is not only distinguished by the skull-like markings upon the back of the thorax, but also by several other peculiarities, amongst which are the gigantic size, very robust and obtuse body, the broad entire wings, with the anal angle of the hind pair produced into a lobe, the short thick antennæ hooked at the tip, and terminated by a hairy seta, and especially the shortness of the spiral tongue, which does not exceed the head in length; the double band upon the hind wings is a character it possesses in common with Sphinx. The gigantic caterpillar also differs in having the horn at the extremity of the body deflexed and tubercular, with the tip curved upwards. The chrysalis is buried deep in the earth; its tongue-case is not exserted, and the surface is not covered with minute asperities. There are several species of this genus which are distributed over the greater part of the globe, one only of which, the largest, is found in this country, to which Linnæus, keeping up his fanciful system of specific nomenclature, applied the name of one of the Fates, in allusion to its skull-like markings.

SPECIES 1.—ACHERONTIA ATROPOS. THE DEATH'S-HEAD, OR BEE TIGER HAWK-MOTH.

Plate ii.

SYNONYMES.—*Sphinx Atropos*, Linnæus, Haworth, Donovan, vol. 9, pl. 289 and 290. Albin, pl. 6. Wilkes, pl. 19. Harris, Aurelian, pl. 37. Swainson.

Acherontia Atropos, Ochsenheimer, Stephens, Hübner (Verz. bek. Schm.) Curtis, B. E. pl. 147. Wood, Ind. Ent. t. 4, f. 10. Duncan, Brit. Moths, pl. 5.

Brachyglossa Atropos, Boisduval.

This magnificent insect varies in the expanse of its wings from four to considerably more than five inches. The upper pair are of a very dark brown colour, varied with black, especially towards the base, near which is an undulated bar of pale ochre; the disc is varied with deep black undulated lines and ferruginous patches, minutely irrorated with white, of which colour there is a central spot and several wavy connected bars beyond the middle, towards the costa. The hind wings are fulvous orange, with a narrow central and a broader dentated bar running parallel with the hinder margin. The head and thorax are brownish black, the latter with a large, pale, skull-like mark on the back; the abdomen is fulvous, with the incisures of the segments black, and a lead-coloured stripe down the back.

The caterpillar is at first dirty red, but afterwards becomes yellowish green, granulated with minute black tubercles on the back, with seven oblique stripes on the side, meeting on the back, the last of which extends to the base of the tail; these stripes are blue anteriorly, and white posteriorly, with a purple tint in the centre. It

chiefly feeds upon the flowers and leaves of the potato and jasmine, but is occasionally found on other plants, as the woody nightshade, thorn-apple, elder, spindle-tree, &c. It is but rarely seen, as it feeds by night, concealing itself in the day under the leaves and in the earth. It is full-grown in August and September, when it descends to a considerable depth underground to undergo its transformations, which, unlike those of the majority of the family, (and rendered more singular by the size of the insect,) are effected in a few weeks; the moth appearing at the end of September or beginning of October. Previously to the moth being hatched, the pupa has been observed by Mr. Curtis to eject some moisture from the two spiracles in front of the thorax, and when it bursts forth the antennæ and limbs are enveloped in a thin pellicle, like tissue paper, which prevents them from adhering, and which drops off as they expand; the wings attaining their full size in a couple of hours.

The large size of the insect, its singularly-marked thorax, and the peculiar noise it emits, have rendered it an object of terror with the vulgar, by whom it has been regarded with dread as the harbinger of pestilence and forerunner of death. Latreille tells us that it appeared one year in Brittany in great numbers, and as at this period an epidemic malady was raging with much violence, the mortality was attributed by the ignorant to this harmless moth.

Much discussion has taken place relative to the mode in which the squeaking sound mentioned above is produced, and which is emitted by both sexes when alarmed, but at present no satisfactory conclusion has been obtained upon the subject. An interesting memoir has recently been published in the "Annales de la Société Entomologique de France" for 1839, detailing a series of observations made in conjunction, with a view to the determination of the question, by Messrs. Duponchel, sen. and jun., Aubé, Boisduval, Pierret, and Rambur.

Réaumur attributes the sound to the friction of the proboscis against the palpi, and the inner surface of the second joint of the latter organs exhibits a peculiar structure, not unfitted for the propagation of such a sound. M. de Johet, however, having deprived a specimen of its probòscis and palpi, found that the noise was still produced, especially when the wings were put in motion; he accordingly considers that this motion acting upon the air contained beneath the scales of the front of the thorax, is the cause of the sound; more especially as a specimen when deprived of these scales was mute. Another observer, M. Lorey, conceived that he had detected the cause in the rushing of the air through two tracheæ at the base of the abdomen, which, in repose, are concealed beneath two pencils of hairs, and which are dilated into a star when the noise is produced.* M. Passerini considered that the sound was produced in the interior of the front of the head, being emitted from a cavity which communicates with the canal of the proboscis, and in which are placed the requisite muscles for the elevation and depression of this organ, the former movement causing the air to enter into, and the latter to expel it from the cavity—in fact the noise was continued although both the proboscis and abdomen were cut off, whereas it entirely ceased when the muscles were either cut through or traversed by a strong pin thrust vertically into the head. More recently, M. Goureau (*Annales*, 1837) has suggested that the sound is produced by the apparatus described by M. Lorey; but that as the apertures in question are not perforated (thus not being spiracles) the sound must be produced in a manner analogous to that of the Cicadæ. All these suggestions have been proved by the experiments of the committee of French Lepidopterists, mentioned above, to be without foundation. That of

* M. Alex. Nordmann, unacquainted with the researches of M. Lorey, adopted the same opinion, in a memoir read before the Academy of Sciences at St. Petersburgh on the 8th of December, 1837.

Réaumur was at once disproved by unrolling the maxillæ, and holding the palpi apart with a pin; yet the noise was still produced—so also by strongly compressing the root of the proboscis with pliers, so as to prevent the passage of air, the opinion of M. Passerini was shown to be untenable. Again, by holding the wings close to the body, and preventing their action upon the frontal scales, the suggestion of M. de Johet is disproved, because at such time the insect cries loudest; the scales remaining perfectly motionless at the time. The observations of Messrs. Lorey and Goureau are in like manner disproved by the action of the apparatus at the base of the abdomen not being always accompanied by the cry; moreover both sexes produce the sound; whereas the apparatus in question only exists in the male—and not only in this, but in other species of Sphingidæ which are mute. On a subsequent occasion M. Duponchel jun. was led to believe that the sound was caused by the friction of the prothorax against the mesothorax; and M. Goureau, (*Annales*, 1838,) that it was by the air passing through the prothoracic spiracles, which are large, and placed on a small protuberance. The last-mentioned author (who has published an elaborate memoir on the sounds of insects) has still more recently (*Annales*, 1840) suggested that the cry of this insect is analogous to that made by the Hymenoptera and Diptera, which he terms "piaulement," caused by the vibrations of the thorax put in motion by its strong muscles, and which gives an impulse to the wings, when their action is complete; and that it is moreover probable that the action of the scales upon the mesothorax contributes to the noise which (unlike that of the Orthoptera and Cicadæ, but like that of certain Hymenoptera) consists of a union of two sounds, one acute, produced by the vibration of the thoracic segments, and the other by the action of the scales in the mesothorax. This suggestion may be easily verified by those who have an opportunity, by holding the insect carefully in the fingers so as to perceive whether there be any decided motion altering according to the strength of the cry. Considering that the insect has now become by no means uncommon in this country, it is not very creditable to our English collectors that no one among them has attempted the solution of the question. The only original observation made upon the subject in this country is one I am now enabled to publish, upon the authority of Mr. Raddon, namely, that the insect is able to produce the sound before quitting the pupa case.

Another peculiarity connected with the history of this moth consists in its attacking bee-hives, ravaging the honey, and dispersing the inhabitants. It is singular that a creature with only the advantage of size should dare, without sting or shield, singly, to attack in their strongholds these well-armed and numerous people; and still more singular, that amongst so many thousands of bees it should always contend victoriously. Huber, who first noticed the fact, asks, "May not this moth—the dread of superstitious people—also exercise a secret influence over insects, and have the faculty, either by sound or some other means, of paralysing their courage? May not such sounds as inspire the vulgar with dread be also the dread of bees?" He also states that he was witness to the curious fact that some bees, as if expecting their enemy, had barricaded themselves by means of a thick wall of propolis and wax, completely obstructing the entrance of the hive, but penetrated by passages for one or two workers at a time; thus instructing us, that at the period when the moth appears, when also wasps and robber bees attack the hive, it is advantageous to narrow the entrances to it so as to prevent the depredations of these obnoxious insects.

The species appears to be distributed over the greater part of England and Scotland, and many specimens are annually obtained by labourers when employed in getting up potatoes: this is a better plan of procuring specimens than by feeding the caterpillars, because, although they thrive well and change to chrysalides, it is difficult to

obtain them in the perfect state, generally dying during their pupation. "Perhaps," observes Mr. Haworth, "in a state of nature they perform their extraordinary metamorphoses deeper in the ground, and consequently in a moister and more equal temperature, than most other species of Lepidoptera; and if so, the cause of their perishing in our breeding-cages is undoubtedly owing to their having in these cages too scanty and dry a soil." I have known fine specimens reared by feeding the caterpillars upon potatoes growing in pots in the open air, plunged in the earth, and the plant covered with gauze. Many instances are recorded of the insect having been captured on board ship, at a considerable distance from land.

DESCRIPTION OF PLATE III.

INSECTS.—Fig. 1. Sphinx Convolvuli (the convolvulus, or unicorn Hawk-moth). 2. The Caterpillar. 3. The Chrysalis.
" Fig. 4. Sphinx Ligustri (the privet Hawk-moth). 5. The Caterpillar. 6. The Chrysalis.
" Fig. 7. Sphinx pinastri (the pine Hawk-moth). 8. The Caterpillar. 9. The Chrysalis.
PLANTS.—Fig. 10. Convolvulus arvensis (the small bindweed).
" Fig. 11. Ligustrum vulgare (the common privet).
" Fig. 12. Abies communis (the spruce-fir).
The insects are all from the collection of the British Museum. The Caterpillars are from Hübner. H. N. H.

SPHINX, LINNÆUS. SPECTRUM, SCOPOLI.

This genus in its restricted state comprises numerous species, distinguished by their elongate, conical bodies destitute of a tuft at the extremity, the more elongated entire wings, the extreme length of the spiral tongue, the long and slender antennæ, hooked at the tip, and terminated by a long and slender hairy bristle. The caterpillars are large, and generally smooth, with oblique, lateral stripes, and a curved, smooth horn at the extremity of the body. The pupæ are distinguished by having the proboscis detached, and forming an arched appendage beneath the breast. The transformations are undergone in the earth.

The perfect insects are of large size, with the abdomen generally banded with different colours. Several species are recorded as natives of this country, on the authority of single specimens, which were in all probability brought from North America,—the real habitat of the species—in the preparatory states.

SPECIES 1.—SPHINX CONVOLVULI. THE UNICORN OR CONVOLVULUS HAWK-MOTH.

Plate iii. fig. 1—3.

SYNONYMES.—*Sphinx Convolvuli*, Linnæus, Donovan, Brit. Ins. vii., plates 228, 229. Haworth, Stephens, Wilkes, plates 20, 21. Harris Aurelian, pl. 21, fig. a—d. Wood, Ind. Ent. pl. 4, f. 11. Duncan, Brit. Moths, pl. 6.

This fine species measures from four to nearly five inches in the expansion of its fore-wings, which are of a greyish-ashy colour, with darker clouds and with a number of slender, black, straight as well as zigzag lines scattered over the surface; the hind wings are paler, with four black bars, the two middle ones being more confluent together, and the outer one parallel with the hind margin of the wing. The fringe of all the wings is white interrupted with brown.

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The head is ash-coloured, with the spiral tongue extremely long, the eyes very large, the thorax dark ash-coloured, with obscure black streaks, the scutellum is bordered on each side with a black crescent, the abdomen is also dusky-ash; the sides of each of the four basal segments are ornamented with a rosy bar, preceded by a white bar at the base, and succeeded by the black edge of each segment; these colours being interrupted in the middle of the back, the sixth segment is destitute of the rosy colour. The feet are ash-coloured, with whitish rings. The antennæ and underside of the body are of a dirty-white colour, the latter with two black patches in the middle of the abdomen. The colours of the wings vary in being much darker, ashy, clouded with black, and in the rosy patches at the sides of the abdominal segments being brighter coloured. This is considered by Mr. Haworth as indicating a diversity in the sex of such specimens; and Mr. Stephens states that the female differs in having the fore wings less clouded, and the posterior of a darker colour.

The caterpillar varies greatly in its colours, being, however, generally green, spotted with black, and with yellow oblique stripes on the side; it is, however, sometimes entirely brown, with the back darker (probably when about to undergo its transformations), and sometimes the stripes at the sides are black. The spiracles are either pink or black, and the caudal horn is dark coloured. It usually feeds on the species of bindweed, especially Convolvulus Sepium; and is to be found towards the end of the summer. It, however, conceals itself during the day, and enters the earth, where it also becomes a rich brown pupa, with the tongue-case long and curved, about the end of July, the moth appearing in September and October. Occasionally, however, the moth does not come forth till May or June, the caterpillars not having been fully grown till a later period than usual.

The species is certainly not of common occurrence, although it occurs in all parts of England, extending to the northern parts of Scotland. A number of localities, from Penzance to Caithness, are given by Mr. Stephens.

SPECIES 2.—SPHINX LIGUSTRI. THE PRIVET HAWK-MOTH.

Plate iii. fig. 4—6.

SYNONYMES.—*Sphinx Ligustri*, Linnæus; Haworth; Donovan, 8, pl. 284; Albin, pl. 7; Wilkes, pl. 22; Harris Aurelian, pl. 2, f. a—h; Wood, Ind. Ent. tab. 4, f. 12; Duncan, Brit. Moths, pl. 4, fig. 2. *Lethia Ligustri*, Hübner (Verz. bek. Schmett.)

This is one of the handsomest and, at the same time, least rare species in the family, varying in the expansion of its wings from three and a half to nearly five inches. The fore wings are of an ashy colour, with the base pale and slightly tinted with rose colour, and having a large dark patch along the inner margin, extending nearly from the base to the tip, and further marked with slender black lines running longitudinally between the veins of the wings; along the extremity of this dark patch runs a waved, ashy, and black stripe, and there is a slender wavy line of a whitish colour running parallel with the outer margin. The hind wings are of a pale rosy colour, darker towards the base, with three black bands; the first, narrow and short, near the base, and the two others, broader, and running parallel with the extremity of the wing; the fringe is uniformly greyish-brown. The hind part of the head and the sides of the thorax are of an ashy-white, but the back of the latter is black, posteriorly irrorated with grey; the sides of the abdomen are of a rich pinkish-red colour, interrupted by black bars, and with a broad dorsal ashy bar, along the middle of which runs a darker line. The under side of the body is pale ashy, with a black line along the centre of the belly.

The caterpillar, which feeds on the privet, lilac, elder, ash, etc., is green, with the caudal horn black above and yellow beneath, and seven oblique stripes on the sides of purple and white; on each side of the head is a strong black mark, and the spiracles are orange.

The young caterpillars, when first hatched, have the tails remarkably long, and the bodies very rugose, but they become smooth at the final moulting. By the end of August or the middle of September they are full-grown, and become of a dirty-red colour, when they descend into the earth, where they change into a dark brown chrysalis, with the extremity slightly bifid, and the tongue-case straight. The moth appears in the following June and July. Sometimes, however, the insect will remain two and even three years in the chrysalis state, and then become winged as perfectly as if it had appeared at the ordinary period.

This fine species is widely distributed throughout England, and is by no means of uncommon occurrence, the caterpillars being easily detected when feeding upon fruit hedges, by the large pellets of excrement observed on the ground. It is much rarer in Scotland.

This insect has afforded Mr. G. Newport the materials for one of the most celebrated anatomical Memoirs which has ever been published upon the internal structure of the annulose animals.

SPECIES 3.—SPHINX PINASTRI. THE PINE HAWK-MOTH.

Plate iii. fig 7—9.

SYNONYMES.—*Sphinx Pinastri*, Linnæus; Donovan 9, pl. 296; Haworth; Stephens; Curtis; Wood, Ind. Entom., tab. 4. fig. 13; Duncan, Brit. Moths, plate 7, fig. 1; Sepp. Vol. 1, tab. 5; Hübner, tab. 13, f. 67; Panzer, F. I. G. 82, 22. Drury, Ins. 1, pl. 27, fig. 2.
Hyloecus Pinastri, Hübner (Verz. bek. Schm.)

This very rare species varies from three to three and a half inches in the expansion of its fore wings, which are of an ashy colour, slightly undulated with darker shades, and marked in the middle of the disc with three unequal-sized black lines, another oblique dusky line extending from the apex; the hinder wings are pale ashy at the base, becoming of a browner hue along the outer margin, the fringe being grey, alternately clouded with dusky; the thorax is grey, with a broad dark lateral band on each side, followed by a white line; the abdomen is banded with black and white, interrupted in the middle by a broad ashy longitudinal stripe, along the middle of which runs a dark line.

The caterpillar is entirely yellow in its first skin; in the second, green with yellow stripes; in the third, deeper green, with three longitudinal lemon-yellow lines on each side; and finally of a rich green, with a ferruginous dorsal line, and a lateral yellow one—the head ochraceous in front, with brown lines; the first segment of the body yellow, spotted with black; and the caudal horn, which at first was straight, becomes curved and black. The chrysalis is dark brown, changing to maroon; the tongue-sheath is short. The insect passes this state in the ground, or under moss, through the winter.

This species is attached (as its name implies) to the pine and pineaster, and is consequently found in the great forests in Germany, and other parts of Continental Europe, in considerable numbers, whereas in this country, where the growth of that tree is comparatively rare, the insect is of the greatest rarity—the only English localities being Colney Hatch wood and the neighbourhood of Esher. Other specimens, however, are stated by Mr. Stephens to have been taken in Rivelstone wood, near Edinburgh, by Mr. Wilson and Dr. Leach: but this is denied by Mr. Duncan, whose opportunities for obtaining correct information lead us to adopt his statement.

SPHINX CINGULATA, Fabr. (Sph. Drurœi, Donovan, *Brit. Ins.* Vol. 14, pl. 469; Curtis, Stephens; Wood, *Ind. Ent.* t. 53, f. 24, figured by Abbot and Smith under the name of Convolvuli var.), is an American species, closely allied to the Convolvulus Hawk-moth, and has been several times captured alive in the neighbourhood of London. Its wings are clouded with ashy and brown, the fore ones with two central small stripes, and several lines of black, the posterior rosy, with three black bands, the abdomen ashy, with alternate black and rosy lateral bars. The expansion of the wings is from nearly three to nearly three and a half inches. The caterpillar feeds on the Convolvulus Batatas.

SPHINX CAROLINA, Linnæus (Haworth; Curtis, *Brit. Entom.* 5, pl. 195; Wood, *Ind. Ent.* t. 53, f. 22), is another North American species, which has been several times taken in this country. Its wings are varied with brown and ashy, and with several slender zig-zag streaks; the hind wings pale brown, with three black bars; the middle one formed of two subconfluent ones; and the outer one acutely dentate; the abdomen brown, with five or six large orange spots on each side, edged with brown. The expansion of the wings is four and two-third inches. The caterpillar is green, with white oblique stripes on the sides, and a pink tail. It feeds on the tobacco and potato.

SPHINX QUINQUE-MACULATUS, Haworth (Curtis; Wood, *Ind. Ent.* t. 53, f. 23; *Sph. Carolina*, Donov., XI. pl. 361), is another North American species, which has not only been captured in the perfect state in this country, but has been reared from the caterpillar, found near Leeds; its wings are clouded with ashy and brown; the posterior having four bands; the two middle ones confluent; and the outer one entire; the abdomen with four large orange spots on each side, margined with brown. The expansion of the wings is four inches and two-thirds.

SPHINX PLEBEIA, described by Fabricius as a native of the islands of America, and by Dr. Harris as inhabiting the southern parts of the United States, has also been introduced as a doubtful native species, several specimens having been found in old English collections, where it is supposed they were placed by mistake for Sph. Pinastri: the wings are grey, with a central white spot, and several rather indistinct black lines; the hind wings light brown, with darker bands; the abdomen grey, with a black dorsal line; the sides white, margined with black; the expansion of the wings is rather more than three inches. It is figured by Wood, Ind. Ent., tab. 53, fig. 25.

SPHINX PŒCILA, Stephens (Illustr. H. 1, 122; Wood, Ind. Ent. tab. 53, fig. 26), is another species, of which a single specimen is contained in the collection of the Zoological Society, latety belonging to N. A. Vigors, Esq., obtained from Mr. Wilkins' cabinet, in which it was also placed as Sph. Pinastri. It is two and three-quarter inches in the expansion of the fore wings, which are rather acute, hoary, clouded with brown, a white spot on the disc, and several longitudinal and oblique black lines; the hind wings brown, with a broad pale fascia, and the sides of the abdomen spotted with black. Mr. Stephens does not hesitate to regard it as an exotic insect.

GENUS IV.

DEILEPHILA*, Ochsenheimer.

The spiral tongue of this genus is considerably smaller in size than in the preceding; the abdomen shorter, and more acute at the tip; the wings comparatively shorter, the anterior ones not having the tips produced into an acute subfalcate point; the hinder margin slightly, but regularly, rounded, and the hinder angle obtuse and not rounded off as in the next genus; the hind wings are also broader than in the latter; the antennæ are rather short, and very clavate at the tips, which are terminated by a hook, ending in a very slender hair; the spiral tongue is much shorter than in the preceding genus. The abdomen is only marked with interrupted dark fasciæ at the base, the other segments having only slender pale lateral bands. The chief character of the genus, however, as distinguished from the following, with which it has been generally united, consists int he peculiar form of the larva, which has the sides of the body elegantly marked with pale spots of different size, and in not having the anterior segments retractile; the caudal horn is short and rugose; and the pupa state is passed at a short distance beneath the surface of the ground.

DESCRIPTION OF PLATE IV.

Insects.—Fig. 1. Deilephila Euphorbiæ (the spotted Hawk-moth). 2. The Caterpillar. 3. The Chrysalis.
" Fig. 4. Deilephila Galii (the madder Hawk-moth). 5. The Caterpillar.
" Fig. 6. Deilephila lineata (the rayed Hawk-moth). 7. The Caterpillar. 8. The Chrysalis.
Plants.—Fig. 9. Euphorbia Paralias (sea-spurge).
" Fig. 10. Galium verum (the yellow lady's-bedstraw).
" Fig. 11. Galium Mollugo (wild madder).

The insects in this plate are all three from specimens in the British Museum. The caterpillar and chrysalis of D. Galii are from the beautiful plate of Füessly, who has given an excellent representation of the insect in its three stages. H. N. H.

SPECIES 5.—DEILEPHILA EUPHORBIÆ. THE SPOTTED HAWK-MOTH.

Plate iv. fig. 1—3.

Synonyme.—*Sphinx Euphorbiæ*, Linnæus; Haworth; Donovan, Vol. 3, pl. 91, 92; Harris Aurelian, pl. 44, fig. a—c; Drury, Ins. 1, pl. 29, f. 3.
Deilephila Euphorbiæ, Ochsenheimer; Stephens; Curtis, Brit. Ent., Vol. 1, pl. 3; Wood, Ind. Ent., pl. 4, fig. 14; Duncan, Brit Moths, pl. 8.
Hyles Euphorbiæ, Hübner (Verz. bek. Schmett.)

This beautiful species generally measures about three inches in the expansion of the fore wings, the ground colour of which is greenish brown, having a broad livid stripe, extending from the base of the inner edge to the tip, the anterior portion of which has a rosy tint, but is very irregular in its outline, a large patch of the ground colour being near the base, and another near the middle of the wing; the outer margin of the wing is also bordered with a dusky or livid rosy hue; the base of the wings has a white patch, and the inner margin

* This generic name is derived from the Greek δειλη, the evening, and φιλέω, to love, in allusion to the twilight flight of the insects; the name Smerinthus is evidently from σμήρινθος pro μήρινθος, a thread; but I do not perceive the allusion; (this name is prior to Dalman's generic name Dilina, *Swed. Trans.* 1816;) and Acherontia is a fanciful name, retaining the allusion to the specific name of the Fate, Atropos, the river Acheron leading to the infernal regions.

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has a slender edge of white; the hind wings are darker rose-coloured, having the base, and a bar running parallel with the hind margin, black. The head and thorax are dusky olive-green, with the sides whitish; the hind part of the latter paler; the two basal segments of the abdomen with a black patch on each side, and the remaining segments margined at the sides with white. The tint of the livid or rosy portion of the wings is very variable, as well as the width of the submarginal fascia of the hind wings. The females have the hind wings more strongly marked with black than the males.

The caterpillars, when full grown, are as handsome as the perfect insect, being then of a black colour, with a vast number of minute whitish raised spots arranged transversely in rows, and with a large pale yellow spot on each side of each segment, beneath which is a smaller one; whilst the head, a dorsal stripe, the base of the caudal horn, a spot on each side of each joint above the feet, and the pro-legs, are bright red; when first hatched, however, they are dark black, subsequently gaining the red head, tail, and spots. They feed upon Euphorbia Cyparissias and Paralias (the cypress-leaved and sea spurge), but will not touch some of the other species of the genus. The chrysalis is of a light ochre-brown colour, with the wing-cases somewhat elongated.

In the time of Drury, this insect had not been ascertained to be a native of this country; and Moses Harris figured the moth which he had reared from a French pupa, together with the larva of the next species, which he considered to be that of the present insect. Mr. Haworth, however, gave Devonshire as the locality of this species, in which county it has been discovered by William Raddon, Esq., the celebrated engraver, by whom a beautiful series of figures of the insect in all its states, and an interesting account, has been published in the Entomological Magazine. The caterpillars feed upon the sea spurge (Euphorbia paralias), which grows in plenty on the sand hills in the neighbourhood of Barnstaple and Braunton Burrows. These sand hills are of great extent, and, as suggested by Mr. Curtis, must have been collected by the winds and storms to which they are constantly exposed. During the winter, the whole soil is frequently removed, so as completely to alter the surface of the country; a great number of the pupæ (which are ordinarily found at a short distance below the surface) must consequently be destroyed, or buried at a considerable distance below it, where they probably lie hid until they are brought to light and life by the influence of the elements, and another change of the surface.

These circumstances account for the great irregularity in the appearance of the insects. In 1814, for instance, they were so plentiful that Mr. Raddon found not less than one hundred minute larvæ upon an armful of spurge, which he had cut at dusk the preceding evening. The rarity of the insect is also increased by the conspicuous appearance of the caterpillars, which renders them an easily-discovered prey to marine birds, and by the difficulty of rearing them; the late Mr. Fuseli, the Royal Academician, who was a most zealous entomologist*, having been able to obtain only a single moth from twenty pupæ. The larvæ are full-grown in September, and the moth appears in the following June. The caterpillars have also been taken near Coventry. Sometimes the pupæ remain unchanged for two seasons—a wise provision of Nature, to prevent the destruction of the entire brood.

* Mr. Raddon tells us that Fuseli once chided him for apathy, and concluded by saying, "When I was of your age, I often went at two or three o'clock in the morning into the corn-fields and woods to collect for my brother, and many of the insects figured by him (in his Archives) were from my drawings;" and to show that his enthusiasm was not quite lost in the decline of his life, he adds that, on the conclusion of his last lecture, and when descending the rostrum, Fuseli said to Mr. Cooper, the R. A., who is also an enthusiastic entomologist, and who kindly offered his assistance, "I thank you; O, is it you, Cooper; well, where is Raddon? Has he taken Atropos?" He was then upwards of eighty.

SPECIES 2.—DEILEPHILA GALII. THE SCARCE-SPOTTED HAWK-MOTH.

Plate iv. fig 4—5.

SYNONYMES.—*Sphinx Galii*, Hübner, Sphing. pl. 12, fig. 64; Haworth, Ent. Trans., 1, pl. 4; Harris, Aurelian, pl. 44, fig. b (caterpillar); De Geer, Ins. 1, pl. 8.

Deilephila Galii, Ochsenheimer; Leach; Stephens, Ill. H. 1, pl. 12, f. 2; Wood, Ind. Ent. t. 4, f. 15; Duncan, Brit. Moths, pl. 7 f. 2.

Hyles Galii, Hübner, Verz. bek. Schm.

This species is very closely allied to D. Euphorbiæ, and is with difficulty discriminated from that beautiful species, although unquestionably distinct. The expansion of the fore wings is three inches or rather less; and their ground-colour is dark brown, tinged with olive or green, having a somewhat broad irregular bar of a pale yellowish colour, extending from near the base of the inner margin to the apex; two branches of the same colour extend from the front edge of this bar, and run obliquely towards the costa. The apical margin is ashy, the inner edge of this colour being irregular; a fine white edging extends along the inner margin of the wing. There is also a white and a black spot at the base of each wing, the latter bordered with white, and a small discoidal patch of long whitish hairs. The hind wings are clouded with bright rosy-red, with the base, and a bar running parallel with the hinder margin, black. The head and thorax are dark brown, slightly margined with white at the sides; and the latter is paler behind. The abdomen is brown, with two black bars at the base, interrupted in the middle, and succeeded by white bars of the same extent; there are also several similar white bars, but more indistinct, near the extremity of the body. Along the middle of the back is a row of small white dots, by which the species is at once distinguished from D. Euphorbiæ, as well as the deeper, more terminal, and blacker band, near the margin of the under wing; but more especially by the broad dusky border of all the wings beneath, which in D. Euphorbiæ are not bordered at all. The antennæ are brown, with the tips white; and the under side of the thorax and abdomen is tinged with green.

The caterpillar is of an olive-green colour, with a yellow dorsal line, and a row of yellow pear-shaped spots, bordered with black on each side of each segment. The spiracles are yellow, and there is a line of the same colour above the legs; of which latter the fore ones are black, and the pro-legs flesh-coloured. It feeds on several species of Galium, such as the wild madder (G. mollugo), the yellow lady'sbedstraw (G. verum).

This is a very rare species in this country. The earliest recorded instance of its occurrence is given by Harris in the Aurelian, in which he has figured the caterpillar, which was found at Barns-Cray, Kent. He, however, mistook it for that of D. Euphorbiæ. Mr. Haworth possessed a specimen from the cabinet of Captain Lindegren; but he also, like Linnæus, long mistook it for a variety of S. Euphorbiæ. He, however, figured it as distinct in the Entomological Transactions; having been informed that Colonel Montague, the distinguished ornithologist, had taken the larvæ of both species in Devonshire, from which he had succeeded in rearing the moths. Other instances have been recorded of its capture in Cornwall and Devonshire, as well as in the neighbourhood of London, the Isle of Wight, near Warwick and Worcester, Twizel, N. B., Cum Wheaton, Cumberland; Cramond, near Edinburgh. Mr. H. Doubleday also took it, very early in the morning, in August, 1831, hovering over the flowers of Argemone grandiflora. On the Continent it appears widely distributed, although most abundant in latitudes south of Paris, being rare near the last-named city.

SPECIES 3.—DEILEPHILA LIVORNICA. THE STRIPED HAWK-MOTH.

Plate iv. fig. 6—8.

SYNONYMES.—*Accipitrina Livornica*, Petiver, Gaz. pl. 12, f. 9.
Sphinx Livornica, Hübner, Sphing. pl. 12, f. 15.
Deilephila Livornica, Curtis, Brit. Ent. No. 1, 2d edit. p. 8 verso; Stephens, Catal.; Wood, Ind. Ent. t. 4, f. 16.
Phryxus Livornica, Hübner, Verz. bek. Schmett.
Sphinx Kochlini, Fuesslys Archiv., pl. 4.
Deilephila lineata, Ochsenheimer; Curtis (1st edit.); Steph., Ill. H. 1, pl. 12, f. 1; Duncan, Brit. Moths, p. 152 (but not the Sphinx lineata of Fabricius and Donovan, which is the Sphinx Daucus of Cramer, and which is figured by Wood in the Ind. Ent. t. 53, f. 27.)

This handsome species is equally rare with the preceding. The expansion of its fore wings is 3¾ inches; their upper surface is of an olive-brown colour, with a rather broad pale stripe extending across the wing from near the base of the inner margin to the tip; a whitish subtriangular discoidal spot in the middle, and another beyond the middle, indicate the oblique short subcostal bars of the preceding species; the apical margin is ashy. This species is, however, strikingly distinguished by having the veins of the wings forming slender whitish streaks. The hind wings are pale rosy-pink, with the base and a submarginal fascia black; the anal margin being clothed with white hairs. The head and thorax are olive-brown, margined with white; the latter with two short white dorsal streaks, and the hind part paler. The abdomen is much more varied than in the two preceding species; a pale narrow line running down the back, intersecting the small white patches (margined with black in the middle of each segment at the base); the sides of the abdomen being also ornamented with large white patches, spotted at the base with black. The antennæ are brown, tipped with white.

The caterpillar is of an olive-green or yellow tint, spotted with black; the head, a stripe down the back, two rows of lateral spots, and the tail rose-coloured above, but black beneath; the belly white, and a longitudinal line on each side below the spiracles pale yellow. It feeds on the lady's bedstraw, the Sonchus arvensis, and the common vine. It is full-fed at the end of July, and the moth appears at the end of August. Mr. Stephens, however, mentions the capture of a very perfect and fine specimen in June.

There are but few instances on record of the capture of this fine species in this country; it has, however, been taken in Norfolk, near London, Kingsbridge in Devon, Cornwall (Haworth), near Lewes in June, near the Land's End, at Hammersmith in April, in the Isle of Wight and in Lancashire.

DEILEPHILA LINEATA, Fab. (Sph. Daucus, Cramer), as mentioned in the synonymes of the preceding species, has been confounded with D. Livornica. It is, however, perfectly distinct, being a native of North America, and at once distinguished (as correctly described by Fabricius) by possessing six instead of four white lines on the thorax. The larvæ also differ, according to Dr. Harris.

CHŒROCAMPA, DUPONCHEL.

This genus was established in 1835 by M. Duponchel in the supplement to Godart, to receive those Sphingidæ which have the head and fore part of the body of the caterpillar retractile; the head being very small, and the first three segments abruptly diminishing in size from the fourth, which gives to the fore part of the body a resemblance to the head and mouth of a hog. Hence the French name of the larvæ, cochonnés; and the

generic name proposed by Duponchel, which is derived from χοῖρος, a hog, and κάμπη, a caterpillar. This peculiarity seems to have suggested to Linnæus the names that he has given to two of the species, viz. porcellus, the pig, and Elpenor, the name of one of the companions of Ulysses, who was changed to a hog by Circe. (Harris, in Amer. Journ. Sc. and Art, v. 2, No. 36.) By our English collectors, these same insects have long been known under the name of Elephant Hawk-moths; evidently from the resemblance which the front part of the body of the caterpillars bears to the snout of the elephant. In 1836 Mr. Duncan proposed for these insects the generic name Metopsilus, being at the time unaware of the step taken by the French author above mentioned. Long previously, however, Hübner had formed them into the second of his five divisions of the typical Sphingidæ*, under the name of Eumorphæ; which name having the priority I should have adopted, had it not been in use for an exotic genus of beetles. Hübner has formed each of our English species into a named section; one of which, Daphnis, has since been adopted by Mr. Curtis, in his British Entomology, for Sphinx Nerii; but if such a minute division be adopted at all, the British Sphingidæ ought to be separated into nearly twenty genera. Sphinx Nerii, however, differs from the other Chœrocampæ in the very slender palpi, whereas they are very broad in Elpenor.

In addition to the retractile structure of the front part of the body of the caterpillars, we find that instead of having the sides of the body marked with slender oblique bars, several of the segments (generally the fourth and fifth) are marked with a large eye-like spot on each side. The caudal horn is short and smooth, being sometimes nearly obsolete. They form their cocoons of leaves on the surface of the ground. The pupa has not the tongue-case exserted. The perfect insects have the antennæ but slightly clavate, hooked at the tip, and terminated by a setose bristle, and biciliated beneath in the males. The fore wings are very acute and almost hooked, in consequence of a sinus along the hind margin; the spiral tongue is of moderate length. The abdomen is never marked with transverse bars at the sides, but is sometimes longitudinally striped; and the hind wings are somewhat lobed at the anal angle.

DESCRIPTION OF PLATE V.

INSECTS.—Fig. 1. Chœrocampa Nerii (the Oleander Hawk-moth). 2. The Caterpillar. 3. The Chrysalis.
„ Fig. 4. Chœrocampa Celerio (the Sharp-winged Hawk-moth). 5. The Caterpillar. 6. The Chrysalis.
„ Fig. 7. Chœrocampa Elpenor (the Elephant Hawk-moth). 8. The Caterpillar.
„ Fig. 9. Chœrocampa porcellus (the small Elephant Hawk-moth). 10. The Caterpillar.

PLANTS.—Fig. 11. Vinca major (the lesser Periwinkle).
„ Fig. 12. Epilobium hirsutum (the hairy Willow herb).
„ Fig. 13. Galium verum (yellow Bedstraw).

Chœrocampa Nerii being but very rarely taken in this country, I have not been able to make my drawing from a British specimen. The foreign specimen from which it is taken is a very beautiful one from the neighbourhood of Florence; which, however, differs in no respect from the individuals that have been captured in England, except in brightness of colouring, the green markings being particularly vivid and brilliant. C. celerio is from a Teneriffe specimen, also in the British Museum, which differs slightly from Hübner's figure of a north of Europe specimen. I have since seen in the collection of Mr. Doubleday a true British specimen, which corresponds in every respect with the Teneriffe insect which I have figured, and from which I should infer that Hübner had not figured this insect with his usual accuracy. Chœrocampa Elpenor is from a very fresh and perfect specimen taken at Bayswater, in the possession of Miss A. Loudon; and C. Porcellus is from a specimen in the British Museum. The larvæ and pupæ are all from Hübner and Godart. H. N. H.

* Hübner's four other groups are—

St. 1.—Bombiliæ, composed of Macroglossa and Sesia.
St. 3.—Deilephilæ, „ Deilephila.
St. 4.—Manducæ, composed of Sphinx and Acherontia.
St. 5.—Smerinthi, „ Smerinthus.

Each of these groups being divided into various named minor sections and sub-sections.

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SPECIES 1.—CHŒROCAMPA NERII. THE OLEANDER HAWK-MOTH.

Plate v. fig. 1—3.

SYNONYMES.—*Sphinx Nerii*, Linnæus; Rosel, Inst. Belust. v. 3, t. 15, 16; Stephens, Ent. Mag. vol. i. 525, and Illust. Haust. 4. p. 384; Wood, pl. 52, f. 37; Ernst. 3, pl. 104, f. 153, a—f.
Metopsilus Nerii, Duncan, Brit. Moths, pl. 9.
Daphnis Nerii, Hübner (Verz. bek. Schm.); Curtis, Brit. Ent. pl. 626.
Deilephila Nerii, Ochsenheimer.

This magnificent recent addition to our native Sphingidæ measures about 4½ inches in the expansion of its fore wings, of which the ground colour is an olive-green, varied with shades of rosy ochre and white. At the base is a pale spot bearing a dark dot, succeeded by a large patch of deep green, rounded externally and edged with white; then follows a broad pinkish rose bar, extending obliquely across the wing, bearing several pale and dark green dashes, and terminated in an angulated dark brown stripe, edged with white towards the costa, and with a short white stripe running obliquely to the tip of the wing; the hinder angle is darker and varied with shades of brown and greenish; the hind wings are dark at the base; the anal margin whitish, separated from the rest of the wing by a black stripe; across the middle of the wing runs a slender white sinuous bar; the outer margin dark green, except at the anal angle, which is pale coloured. The antennæ are pale. The head and thorax dark green, the latter with a cross line in front; the sides and hind part paler. The abdomen is greenish-brown, with the base and the upper side of the terminal segment dark.

The immature caterpillar is of a nearly uniform ochre-yellow colour, but when full grown it is pale green, with a white lateral stripe extending from the fourth segment to the tail, which is short, deflexed, and rugose. The body beneath this line, and the anterior and anal segments, are yellowish-green; the third segment with a large blue patch on each side, composed of a double white pupil and a black iris; the spiracles are black, bordered with yellow, and the fore feet are blue-black. As its specific name implies, it feeds on the Rose bay (Nerium oleander); it is, however, occasionally found on the lesser periwinkle.

The first recorded capture of this species was made at Dover, by a lady, in the beginning of September, 1833, as mentioned by Mr. Stephens (in the Entomological Magazine, vol. i. p. 525); by whom, however, its admission as a native species was doubted, on the ground that the Oleander was not a native plant. But as it also feeds on the Vinca minor, I do not hesitate to regard it as indigenous, especially as a caterpillar of it was found in a garden at Teignmouth, in August 1832, and communicated to the late Captain Blomer; the periwinkle being abundant in the garden where it was found. A third instance of its occurrence at Van, near Barnstaple, Devon, has been communicated to me by W. Raddon, Esq. On the Continent it is widely distributed, extending as far as India, and frequenting the south of Europe; being common in the neighbourhood of Genoa, Turin, etc. Occasionally, however, it occurs in great numbers in more northern latitudes; thus in 1835, it abounded almost all over France, as we learn from various articles published in the Annales de la Société Entomologique de France, etc.

SPECIES 2.—CHŒROCAMPA CELERIO. THE SILVER-STRIPED HAWK-MOTH.

Plate v. fig. 4—6.

SYNONYMES.—*Sphinx Celerio*, Linnæus; Donovan, Brit. Ins. 6, pl. 190, 191; Haworth.
Deilephila Celerio, Ochsenheimer, Curtis, Stephens; Wood, Ind. Ent. t. 4, f. 17.
Phalæna inquilinus, Harris, Exposition, pl. 28, f. 1.
Metopsilus Celerio, Duncan, Brit. Moths, pl. 10.
Hippotion Celerio, Hübner, Verz. bek. Schm.

The expansion of the fore wings varies from 2⅔ to 3 inches. The ground colour of the wings is brownish-

grey, with black lines; the fore edges white, margined with black; a whitish stripe extending from the inner margin near the base, and extending to the tip of the wings; another white streak on the disc, where there is also a black spot edged with ochre; the outer margin of the wing is pale grey, with a dark lunulated stripe running near the edge. The hind wings are dark rose-coloured at the base, succeeded by a broad black bar, which does not extend to the anal margin; this is followed by a rosy bar, separated into patches by the dark veins, and followed by a narrow black waved bar, the margin of the wing being greyish. The body is brownish-grey, with two ashy-white lines extending from the front of the head to the base of the wings. The remainder of the thorax is dark ashy-coloured, with a whitish stripe on each side, and two yellow dorsal ones; another slender stripe of a silvery-white colour along the back of the abdomen, on each side of which there is, moreover, a row of whitish spots.

The caterpillar is generally of a brown colour, with two yellow lines on each side, the upper one commencing at the sixth segment and terminating at the base of the tail, and the lower one formed of a row of lunules placed above the spiracles; the fourth and fifth segments are ornamented at the sides with a large eye-like spot, edged with a slender yellow iris. Its ordinary food is the common vine, but it also feeds on the yellow lady's bedstraw (Galium verum).

This species is extremely rare in this country, although it has occurred both in the larva and perfect state in various parts of the country; near London, near Eltham in Kent, Wisbeach, Leicester, Lewes, Norwich, in the Isle of Ely, Great Baddow (Essex), near Oxford, Birmingham, and Manchester. It is also rare on the Continent, except in the southern part, where, as well as in the island of Teneriffe and the Cape of Good Hope, it is abundant. The caterpillar is full-fed at the end of July or beginning of August, and sometimes the moth appears shortly afterwards; although occasionally it is not produced till the following summer. The perfect insect has been found in July and August.

SPHINX ARGENTATA, Haworth, is a species allied to Celerio, of which one or two specimens were preserved in old cabinets (probably placed there by mistake for the latter species), and which is considered by Mr. Stephens to have no claim to the rank of a native species; indeed, it is completely omitted by Mr. Curtis. It is nearly three inches in expanse. The fore wings grey, unspotted, with a straight oblique whitish bar, and several nearly obsolete brown streaks; and the hind wings brown, with a pale ochreous streak at the anal angle. It is probably synonymous with Sph. Celæno of Esper, and is figured by Wood, Ind. Ent. pl. 53, f. 28.

SPECIES 3.—CHŒROCAMPA ELPENOR. THE ELEPHANT HAWK-MOTH.

Plate v. fig. 7—8.

SYNONYMES.—*Sphinx Elpenor*, Linnæus; Haworth; Donovan, vol. iv. pl. 122; Samouelle, Comp. pl. 6, f. 2; Harris, Aurelian, pl. 7, fig. a—h; Wilkes, pl. 26.

Deilephila Elpenor, Ochsenheimer; Curtis; Wood, Ind. Ent. t. 4, f. 18.

Metopsilus Elpenor, Duncan, Brit. Moths, pl. 11, fig. 1.

Oreus Elpenor, Hübner, Verz. bek. Schmett.

This rather common species has the wings of an olive colour, with the fore edge, a spot at the base, two oblique fasciæ, and the outer margin of the fore wings, of a purplish red; the hind wings have also the hinder margin of the same colour, and the base blackish; whilst the fore ones have a small discoidal dot, and the hinder margin whitish. The antennæ, thorax, and abdomen are olive-coloured; the palpi and four rather curved lines

on the thorax, and a line down the abdomen, purplish red. The sides of the thorax are white. The abdomen has a black spot at the base, and a white line and two spots at the side. The expansion of the fore wings is 2½ inches or rather more.

The caterpillar is at first green; but after the second moulting, it becomes of a brown colour or varied with yellow, with a dark stripe down the back, and several black or grey and yellow spots near the spiracles. The sides of the fourth and fifth segments are also ornamented with a large eye-like spot. It feeds on the yellow lady's bedstraw, willow herbs, the common vine, &c., and is full-fed in the month of July, the moth appearing in the following summer. It is widely distributed over our island, having been found in Devonshire, Cambridgeshire, various parts of Scotland, etc. It is far from uncommon in Hackney and Battersea marshes. The caterpillar is very subject to the attacks of a large black Ichneumon.

SPECIES 4.—CHŒROCAMPA PORCELLUS. THE SMALL ELEPHANT HAWK-MOTH.

SYNONYMES.—*Sphinx Porcellus*, Linnæus; Haworth; Donovan, vol. ix. pl. 314; Wilkes, pl. 16.
Deilephila Porcellus, Ochsenheimer; Curtis; Stephens; Wood, Ind. Ent. pl. 4, f. 19.
Metopsilus Porcellus, Duncan, Brit. Moths, pl. 11, fig. 2, 3.
Theretra Porcellus, Hübner, Verz. bek. Schmett.

This species is considerably like the preceding, but much smaller, the expansion of the fore wings being generally about two inches. They are of an ochraceous olive colour, with the fore margin varied with rosy patches, and a rosy-coloured, irregular, broad, apical margin, and two dark oblique bars running across the wings. The hind wings blackish at the base, with a broad purplish hind margin. The head, thorax, and abdomen rosy or yellowish on the back; the sides of the thorax with a tuft of whitish scales. The antennæ and fringe of the wings are white.

The caterpillar has the tail almost obliterated, and is of a blackish-brown or dirty-green colour, with a large blue eye-like spot at the sides of the fourth and following segment of the body. It feeds upon the same plants as the larvæ of the preceding species.

Although much rarer than the preceding, it appears to be as widely distributed, having been found in many parts of the country, and sometimes rather plentifully. It occurs in the winged state at the end of May and beginning of June.

MACROGLOSSA, SCOPOLI, OCHSENHEIMER.

This genus is distinguished from all the preceding Sphingidæ by its diurnal flight and tufted tail; and from the following by its wings not being fenestrated. The palpi are porrected in front of the head, forming a short beak, having the second joint very large and rounded, and the terminal joint very minute (as in the true Sphingidæ). The antennæ are clavate, with the tip hooked and scaly, and terminated by a few bristles. The maxillæ or spiral tongue is very long, whence in fact the name of the genus; it being derived from the Greek μακρός, long, and γλῶσσα, the tongue. The larva, as in most of the preceding genera, is furnished with a caudal horn; and the pupa is concealed in a cocoon placed on the surface of the ground.

DESCRIPTION OF PLATE VI.

INSECTS.—Fig. 1. Macroglossa stellatarum (the Humming-bird Hawk-moth). 2. The Caterpillar. 3. The Chrysalis.
" Fig. 4. Sesia Bombyliformis (the narrow-bordered Bee Hawk-moth). 5. The Caterpillar. 6. The Chrysalis.
" Fig. 7. Sesia fuciformis (the broad-bordered Bee Hawk-moth).
" Fig. 8. Ino statices (the Green Forester). 9. The Caterpillar. 10. The Chrysalis.
" Fig. 11. Anthrocera Filipendulæ (the six-spotted Burnet-moth). 12. The Caterpillar. 13. The Chrysalis. 14. The Cocoon.
" Fig. 15. Anthrocera Loti (the five-spotted Burnet-moth).
" Fig. 16. Anthrocera Loti (a variety).

PLANTS.—Fig. 17. Galium aparine (Goose-grass).
" Fig. 18. Cardamine pratensis.
" Fig. 19. Spiræa filipendulæ (common Dropwort).
" Fig. 20. Scabiosa succisa (Devil's-bit Scabious).

I had only figured two of the British species of the genus Anthrocera, having been tempted to consider the others as mere varieties. The two species figured are, A. Filipendulæ, with *six* spots and the *fringe* only of the posterior wings black; and A. Loti, with *five* spots and a black *border* on the posterior wing, within the black fringe. Mr. Stephens, however, assures me two other species must be allowed, namely, A. Meliloti and A. Trifolii; A. Meliloti having the anterior wings semi-transparent, of a pale green, and the antennæ much more slender, whilst on the posterior wings the black border is less conspicuous than in A Loti; and A. Trifolii, being smaller than A. Loti, with the red marks much fuller in colour, and the black border much deeper and more conspicuous. I shall, therefore, give figures of those two species in plate 8, drawn from Mr. Stephens' specimens. I have not figured the larva of A. Loti, as I cannot but suspect that there has been some mistake respecting it; for while the species is, in its perfect state, so very similar to A. Filipendulæ, the caterpillar is represented as totally different, not only in colour, but also in shape, being what is termed onisciform, similar to that of I. statices. The variety of A. Loti with the spots running into one long irregular patch and of a pale orange colour instead of red, is from a specimen in the British Museum, which was of the same brood as a specimen in the collection of Mr. Stephens, in which the markings, though of the same pale colour, preserve their usual form.

The perfect insects are all from specimens in the British Museum; and the larvæ and pupæ from Hübner, Sepp, and Godart. H. N. H.

SPECIES 1.—MACROGLOSSA STELLATARUM. THE HUMMING-BIRD MOTH.

Plate iv. fig. 1—3.

SYNONYMES.—*Sphinx Stellatarum*, Linnæus; Haworth; Donovan, vol. vii. pl. 155. Harris, Aurelian, pl. 24, fig. f—l. *Macroglossa Stellatarum*, Ochsenheimer; Curtis, Brit. Ent. pl. 747; Stephens; Wood, Ind. Ent. pl. 4, fig. 20; Duncan, Brit. Moths, pl. 12, fig. 1. *Psithyros Stellatarum*, Hübner, Verz. bek. Schmett.

The expansion of the fore wings of this interesting species varies from 1¾ to 2 inches. They are of a dusky brown colour, with several more or less obsolete, and two more decided black, waved, transverse bars, and a blackish discoidal dot; the hinder wings are deep bright orange-coloured, with the base brownish; the margin darker coloured, especially towards the outer angle. The body is brown, with the hind part of the abdomen black; the sides of the latter are varied with black and white, and the caudal tuft is black: the insect has the power of expanding and shutting the latter up.

The caterpillar is dark green, with a dusky line down the back, a white stripe along the sides terminating at the tail, and a yellow line below this latter; the true legs are yellow. It feeds on different kinds of Galium (bedstraw) and Rubia (dyer's weed). Mr. Haworth states that there are three broods in the year, the larva being found at the end of March, June, and August, and the imago at the end of April, June, and September. Mr. Dale has, however, found it at the middle of October; and Mr. Haworth mentions a specimen having been taken at Christmas; which makes it probable that some of the September brood may occasionally live through the winter, like many species of Papilio. Mr. Curtis, however, thinks that there is a more or less

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regular succession of the insect during the summer, partially influenced by the state of the weather. "This interesting species in the winged state frequents gardens, flying in sunny weather between the hours of ten and twelve in the morning, and those of two and four in the afternoon. Its food is the nectareous juice of tube-bearing flowers. This it extracts with amazing address by the assistance of its exserted spiral tongue, inimitably poising itself all the while on rapidly vibrating wings; whence its name of Humming-bird. It is delightful, indeed, to the entomological eye of an Aurelian, to behold and contemplate the dexterity exhibited by this charming insect whilst it sails, all gaiety and grace, round the tall sprig of a larkspur or other flower, probing to the bottom every single tube, neglecting none, and trying no one twice."—Lep. Brit., p. 67. Fortunately the species is by no means of rare occurrence in nearly every part of the kingdom, so that scarcely any one who delights in the cultivation of flowers has not observed its interesting movements.

SESIA.

This genus affords, in its nomenclature, an instance of the confusion which has resulted from the want of uniformity in the practice of naming the different divisions into which some of the old Linnæan and Fabrician genera have been cut up; the consequence of which is, that the entomologists of different countries employ different generic names for so many of the same groups. Sesia, as proposed by Fabricius in his earlier works, was a complete magazine; in which, however, we find the humming-bird moth and the narrow and broad-bordered bee sphinges placed towards the beginning of the genus, whilst the slender-bodied currant-tree hawk-moth and allied species were placed at the end of the genus. In his last work, however, the Systema Glossatorum, he separated the latter species under the generic name of Ægeria, which name has been adopted in the true Fabrician sense by English entomologists. Ochsenheimer, however, as well as Latreille, have adopted Scopoli's name, Macroglossa, for the several species first mentioned; whilst for the latter, they injudiciously retain the Fabrician name Sesia. As, however, it is quite clear that Fabricius never contemplated the slender-bodied clear-winged species as the types of his genus Sesia (as is unquestionably proved by his separating them under a distinct name, Ægeria), I consider it will be proper to reject the name of Sesia for the last-named species; although it is, perhaps, equally incorrect to employ it for the narrow and broad-bordered bee sphinges, the real type of the genus, as given in the last work of Fabricius, being the Sphinx Œnotheræ, which Boisduval has formed into the genus Pterogon. Indeed, it is rather with the view of conforming to the works of modern English authors, that I retain the present group as distinct, and under its present name; because, as regarded both by the German and French lepidopterists, the species of which it is composed are too closely allied to M. stellatarum, being separated chiefly by the slight character of having the wings transparent; a character which has been shown, by a recent observation of Mr. Doubleday, mentioned below, to be of trifling value, and which would render the adoption of other genera necessary amongst the Fabrician Ægeriæ. In addition, however, to this character, we find the body shorter and more robust, and clothed with long hair; the antennæ longer and much more clavate; the head smaller; the spiral tongue shorter; the palpi more pilose, with the second joint longer: so that the name Sesia may still be retained, at least, in a subgeneric sense.

SPECIES 1.—SESIA FUCIFORMIS. THE BROAD-BORDERED BEE HAWK-MOTH.

Plate vi. fig. 7.

SYNONYMES.—*Sphinx fuciformis*, Linn. Fn. Su. No. 1092; Haworth; Fabricius; Hübner; Zetterstedt (*Macroglossa* f.), Donovan 3, pl. 87; Harris, Exposition, pl. 13, f. 2; Duncan, Brit. Moths, p. 168*.

Sesia fuciformis, Curtis; Westwood, Entomol. Text Book, pl. 5, fig. 2.
Macroglossa Bombyliformis, Ochsenheimer.
Sesia Bombyliformis, Stephens; Wood, Ind. Ent. t. 4, f. 21.
Cephanodes Bombyliformis, Hübner, Verz. bek. Schmett.

The fore wings in this species measure about 1¾ inches in expanse. They have a moderately large discoidal transparent patch; the base, fore margin, and *broad* hind margin greenish-brown; the hind wings have also a *rather broad* dark margin, the base and anal margin being also dark; the transparent portion of the wings is traversed by the black veins; and in this species there is a line of dark scales running along the middle of the discoidal cell, and imitating a distinct vein. The body is of a yellowish ash-colour, a broad rich chesnut brown fascia running across the middle of the abdomen, beyond which, on each side, are two patches of fulvous hairs; and the tail is almost entirely black. The antennæ and spiral tongue are black, and the fore legs pale.

The caterpillar is green, with a yellowish dorsal and lateral line, and occasionally with some reddish spots on the sides. The tail is straight, of a dark brown colour, with the tip fulvous. It feeds on the honeysuckle and yellow lady's bedstraw, etc.

The perfect insect is not very uncommon at the end of May in damp open spaces in woods of the south of England; it does not, however, appear to be found farther north than York. It delights to fly in the sunshine, extracting the nectar from the flowers of the harebell.

Entomologists are at variance respecting the identity of this species with the Linnæan Sphinx fuciformis, Mr. Stephens adopting the opinion of Ochsenheimer that it is not identical therewith. I think, however, that the Linnæan description, "abdomen cingulo nigro, barba *laterali* pone cingulum albida," sufficiently identifies it with the Linnæan species†.

Mr. E. Doubleday has shown me a specimen of this insect taken immediately after emerging from the chrysalis, in which the transparent portions of the wing are rather closely clothed with broad dark scales, which evidently become abraded with the slightest touch. The same circumstance also occurs in the small clear-winged hawk-moths, as mentioned below.

SPECIES 2.—SESIA BOMBYLIFORMIS. THE NARROW-BORDERED BEE HAWK-MOTH.

Plate vi. fig. 4—6.

SYNONYMES.—*Sphinx Bombyliformis*, Esper, Borkhausen, Schrank, Haworth.
Sesia Bombyliformis, Fabricius; Curtis, Brit. Ent. 1. pl. 40; Duncan, Brit. Moths, p. 170.

Macroglossa Bombyliformis, Zetterstedt.
Macroglossa fuciformis, Ochsenheimer.
Sesia fuciformis, Stephens; Wood, Ind. Ent. t. 4, f. 22.
Cephanodes fuciformis, Hübner, Verz. bek. Schm.

The fore wings in this species are broader, and not so much attenuated at the tip as in the preceding species; their expansion is consequently somewhat less. They are further distinguished by the very *narrow dark margin*

* The figures of this and the next species are confused in plate 12 of this work. Although both are bad, fig. 4 is certainly intended for the *broad*-bordered species, and fig. 3 for the *narrow*-bordered bee hawk-moth, although lettered otherwise.

† Since the above was written, I have inspected the Linnæan Cabinet, and find my conjectures confirmed, a specimen of the broad-bordered bee hawk-moth, pinned with a genuine round-headed Linnæan pin, being attached to the label inscribed fuciformis, by Linnæus himself. A specimen of the narrow-bordered species is, however, placed by its side, but it is pinned with a different kind of pin.

of the wings, especially in the hind pair, and by the discoidal cell not having a line of dark scales running through the centre of it. The body is of a golden green, or tawny olive greenish colour; the second and third segments of the abdomen nearly black, and the two following bright orange coloured; fan-tail black, with the middle orange. The antennæ are cyaneous, and the fore feet black.

The caterpillar when about ten days old is covered with several branched spines on each segment of the abdomen, which are subsequently obliterated, the larva becoming smooth, but varying much in colour; being sometimes green with a pale lateral stripe, adjoining which are a row of reddish crescents (sometimes wanting) extending to the tail; there is also a row of oval spots placed obliquely, and extending round the spiracles. It is figured by Curtis. The caudal horn is described by Zetterstedt as straight, whereas in the preceding species he describes it as curved. The caterpillar feeds on the Devil's-bit scabious (Scabiosa succisa), and some other plants.

This species is of rarer occurrence than the preceding, frequenting the same situations, and especially delighting to hover over the flowers of Pedicularis palustris and P. sylvatica, from which it extracts the honey with its long spiral tongue. They have been found at Enborne in Berkshire; Coombe Wood, Epping Forest, New Forest, and Huntingdonshire, are recorded as other localities.

The confusion which has occurred respecting the identity of the former species, has been rendered doubly confounded, by Ochsenheimer and Stephens giving the former species under the name appropriated to the present insect.

FAMILY III. (Vide p. iv.)

ANTHROCERIDÆ, Westw. ZYGÆNIDÆ, Leach.

We have here a family of insects possessing characters as completely at variance with those of the preceding, as are to be met with amongst any of the remaining groups of Lepidoptera. It is true indeed that the antennæ are sometimes clavate and the flight diurnal, thus resembling the terminal Sphingidæ and the Trochiliidæ, but this is all. Throughout the true Sphingidæ we find a peculiar form of the palpi, namely, a swollen second joint, and an almost obsolete terminal joint; in these insects, however, it is the basal joint which is enlarged, whilst the third is almost or quite as long as the preceding. The veins of the wings again, throughout all the preceding insects, offer the same arrangement as shown in our figure of Smerinthus Populi; in the Anthroceridæ, however, they are quite differently arranged, and far more numerous and complicated (as figured in my Introd. to Mod. Classif. v. ii. p. 372). The head is generally furnished with a pair of ocelli behind; the antennæ are never terminated by a pencil of hairs; the spiral tongue and legs are long; the posterior tibiæ furnished with four spurs; and the extremity of the body is not terminated by a fan-tail.

These insects are of comparatively small size, and are distinguished by their brilliancy of colour; in their flight, however, as well as in their larva state, they are slow in their movements, the latter being of a cylindrical form, generally clothed with short hairs, without any spine at the hind part of the body, considerably resembling

those of several of the Bombycidæ. They feed on various species of Leguminosæ and other herbs; and when full grown construct a close cocoon of silk, which they attach to the stems of grass and low plants, out of the upper end of which the pupa partially works itself before it assumes the perfect state. The chrysalis is of the ordinary conical form, without any angular prominency.

INO, Leach. PROCRIS, Fab. ATYCHIA, Ochsenheimer.

This genus is distinguished by the more slender body, the somewhat broader wings, and the nearly straight antennæ; those of the males being slender, but bipectinated nearly to the tip, which consists of much thicker joints, serrated on the inside; those of the female are simple and clavate; the hind tibiæ are only furnished with a pair of very minute spurs. The larva is short, thick, and slightly pubescent, with six pectoral, eight abdominal, and two anal feet; and the chrysalis has the wing-covers elongated*. It is inclosed in a close cocoon, which is spun amongst the leaves, and fastened by a number of loose threads of silk.

The species are few in number, one only being found in this country; they are of uniform tints of bright golden green, blue or brownish-bronze. The generic name, Procris, given to these insects by Fabricius, and still adopted by the French authors, has been rejected by Dr. Leach, being preoccupied in zoology.

SPECIES 1.—INO STATICES. THE GREEN FORESTER.

Plate vi. fig. 8—10.

Synonymes.—*Sphinx Statices*, Linnæus; Donovan, vol. vi. pl. 204, f. 2; Harris, Aurelian, pl. 34, fig. a—f.
Ino Statices, Leach; Stephens; Curtis, Brit. Ent. pl. 396; Wood, Ind. Ent. t. 4, fig. 1; Duncan, Brit. Moths, pl. 2, fig. 3.
Atychia Statices, Ochsenheimer.
Aglaope Statices, Dalman, Zetterstedt.
Procris Statices, Fabricius, Boisduval, Hübner, Verz. bek. Schm.

This pretty species varies, in the expansion of its fore wings, from 1 to 1¼ inches. Its wings are semi-transparent; the body and fore wings clothed with green or golden green scales, having a silky appearance, the body varying to bright copper colour; the hind wings brownish, and the antennæ and legs blackish.

The caterpillar as represented by Hübner and copied by Curtis†, is pale-green, with two rows of black spots down the back, and a row of red dots on each side; it is slightly depressed, with the body tapering at both ends; the head being very small and black. It feeds on the Cardamine pratensis, Rumex acetosa (common sorrel), common dock, etc. The perfect insect is by no means rare, but evidently local; although widely dispersed over England, it does not appear to have been found in Scotland. It frequents meadows and woods, appearing in May and June, and being much attached to the Thrift, Statice armeria. Its flight is rather sluggish.

SPECIES 2.—INO GLOBULARIÆ. THE SCARCE FORESTER.

Synonymes.—*Sphinx Globulariæ*, Hübner; Sp. t. 1, f. 1, 2; Wood, Ind. Entomol. t. 53, f. 19.

This species, since the publication of our former edition, has been captured on the Downs near Lewes, by Mr. J. J. Weir, in the middle of June. The fore wings are of a blue-green colour, the hind ones brown, and the antennæ are pectinated, the tip being simple.

* An elaborate memoir on the transformations of this and the next genus, has been published in the posthumous researches of Lyonnet.

† Mr. Stephens describes the caterpillar as dusky, with two dorsal lines of whitish crescents, and asserts that the figure of Hübner, copied by Curtis, is not that of I. Statices.

ANTHROCERA, Scopoli. ZYGÆNA, Fabricius.

This genus differs from the preceding by its more robust body, and long thick and curved antennæ, which are clavate, with the inner edge serrated, the joints being short and entire; the hind tibiæ are furnished with two pairs of spurs. The larva is short, thick, and soft, and clothed with short hairs, with the head small; it forms a boat-like cocoon, of close texture, on the stems of plants. The species are very numerous on the Continent, although but few have as yet been detected in this country. They are brilliantly coloured, the fore wings being marked with white or red spots, on a dark green or blue ground, and the hind wings often scarlet. They fly during the day, but are very sluggish in their motions; they are gregarious, and sometimes appear in great numbers.

SPECIES 1.—ANTHROCERA FILIPENDULÆ. THE SIX-SPOT BURNET-MOTH.

Plate vi. fig. 11—14.

Synonymes.—*Sphinx Filipendulæ*, Linnæus; Donovan, vol. i. pl. 6; Wilkes, p. 191, fig. super.; Harris, Aurelian, pl. 1, fig. e—h.
Zygæna Filipendulæ, Fabricius; Haworth; Boisduval; Curtis, Brit. Ent. pl. 547.
Anthrocera Filipendulæ, Stephens; Wood, Ind. Ent. pl. 4, fig. 5; Duncan, Brit. Moths, pl. 2, fig. 4.
Thermophila Filipendulæ, Hübner; Verz. bek. Schmett.

This handsome and abundant species varies from 1 to 1½ inches in the expansion of its fore wings, which are of a greenish-black colour, the upper pair being of a satiny texture, with six spots of deep crimson arranged in pairs; two close to the base, two near the middle, and two near the tip, placed obliquely. The hind wings crimson, with an irregular blue margin, which is broadest in the males. The body is greenish-black, and the antennæ blue-black. Numerous varieties occur, occasioned by the greater or less confluence of the red spots of the fore wings, specimens having been found in which all the spots are united together; the terminal spot is also occasionally obliterated. The caterpillar* is of a yellow colour, with three rows of larger-sized black spots on the back and sides, and a row of smaller black spots above the feet on each side. It feeds on the Plantain, Trefoil, Quakers' grass, etc. The perfect insect is found in the months of June and July, occurring in pasture fields and meadows near woods, and is very common in numerous parts of the country, extending far into Scotland, in which country the larva has been observed to feed on Ononis arvensis.

SPECIES 2.—ANTHROCERA LOTI. THE FIVE-SPOT BURNET-MOTH.

Plate vi. fig. 15—16.

Synonymes.—*Zygæna Loti*, Fabricius; Donovan, 9, pl. 319?
Anthrocera Loti, Stephens; Wood, Ind. Ent. t. 4, f. 3; Duncan, Brit. Moths, pl. 2, fig. 5. Not the Sphinx Loti of Hübner and Esper.
Sphinx Loniceræ, Esper. [Stephens, List Lep., Brit. Mus.]
Lycastes Loti? Hübner, Verz. bek. Schmett.

The fore wings in this species measure 1¼ to 1½ inches in expanse, and are of a black-blue colour,* with five red spots, which are exhibited of the same form on the under side; the hind wings red, with a broad sinuated black-blue margin. The antennæ entirely black. Here again varieties occur, in which the spots are more or

* See Mr. Bree's note at the end of the volume, relative to the larva of the British Anthroceræ.

less confluent. The caterpillar is described as of a pale green colour, with a row of black spots on the back, and one on each side; the latter (in the females) with a bright yellow streak beneath.

It feeds upon various species of Trifolium.

Found by Mr. Stephens in Kent; in June, but very rare, according to that author. Mr. Curtis, however, states it to be common in marshy places at the end of May, and the beginning and end of June; Barnewall Wold, Northamptonshire, in July, Mr. F. Bond.

SPECIES 3.—ANTHROCERA TRIFOLII.

Plate viii. fig. 17.

SYNONYMES.—*Sphinx Trifolii*, Esper, Sph. 2, pl. 34, cont. 9, fig. 4 and 5.
Anthrocera Trifolii, Stephens, Ill.
Zygæna Loti, Haworth*; Curtis.
Sphinx Loniceræ, Esp.?

This species varies in the expansion of the wings from 11 to 15 lines, the fore wings having the ground colour of a dark greenish cyaneous colour, and ordinarily with five red spots distinctly visible both above and below; two rather elongated, being placed at the base of the wings, two towards the middle, the anterior one being the smaller of the two, and another single spot beyond the middle; the hind wings are red, with the fringe, and a rather broad and slightly waved border within the fringe, of a cyaneous colour. Varieties occur with the red spots more or less confluent, sometimes even being so united together as to form a single, rather broad, irregular bar. The antennæ and body are blue-black. This is the commonest of the five-spotted species found in this country, occurring at the end of May and June. It is found in marshy places, and is very widely distributed. The larva is described as of a dusky yellow colour, with four rows of black spots; two on the back and two on each side, and as feeding on the trefoil.

ZYGÆNA SCABIOSÆ of Fabricius was described as a British species under the name of the triple-spotted Burnet by Mr. Haworth, from the collection of Mr. Lindegren; but the specimen in question is supposed, by recent authors, to have been a variety of the preceding insect, having the spots confluent. The true Scabiosæ has the fore wings green, with three elongated approximated red spots at the base of the wings placed thus—2. 1, and the antennæ and body black.

SPECIES 4.—ANTHROCERA MELILOTI.

Plate viii. fig. 18.

SYNONYMES. *Sphinx Meliloti*, Esper; Ochsenheimer; Stephens (Anthrocera M.); Wood, Ind. Ent. t. 4, f. 2; Curtis (Zygæna M.)
Sphinx Loti, Hübner, Sph. pl. 17, f. 82.
[*A. Trifolii*, var.; H. Doubleday.]
[*A. Loniceræ*, var.; Stephens, List Lep., B. Mus.]

This distinct species differs from the others with five spots, in having the wings semi-transparent, and of a blackish or blackish-green colour, with two spots placed together at the base, two others near the middle placed rather obliquely, and one beyond the middle towards the fore margin. The fore wings are of a more uniform width throughout; the hind wings are pale red, with an irregular dark margin, intermediate in its width between that of Z. filipendulæ and Z. Trifolii. Mr. Stephens mentions a variety having all the spots

* Mr. Stephens refers the Z. Loti of Haworth to the preceding species. Having, however, received from Mr. Haworth specimens of his Z. Loti, I am enabled to state that they are identical with the Trifolii of Stephens.

confluent. The antennæ in this species are black, and considerably shorter than in the others, with the extremity much less strongly curved.

The caterpillar is described by Esper as greenish, with the head and fore legs black; the others green, a whitish stripe down the back, and a row of black spots on the side. It is said to feed on the trefoil.

Mr. Stephens captured a number of specimens of this species at the end of June, in West Horsley Park, Surrey. There is also a specimen in the cabinet of the Zoological Society (formerly Mr. Vigors') from a different locality; and I possess a specimen taken by myself, but I do not recollect the place of capture.

SPECIES 5.—ANTHROCERA HIPPOCREPIDIS.

SYNONYMES.—*Sphinx Hippocrepidis*, Hübner, Sph. pl. 17, fig. 83 ♂; Stephens, Illust.; Wood, Ind. Ent. pl. 4, fig. 6, (Anthrocera, H.) | *Sphinx Loti*, Hübner, Sph. pl. 5, f. 32 ♀. [*A. Filipendulæ*, var.; H. Doubleday, Stephens, List Lep. B. Mus.]

This species varies considerably in the expansion of the fore wings, from 13 to 19 lines. The wings above are of a black-blue, with six red spots, the sixth being generally small, with a coloured vein running through it; on the under side the red spots are all confluent. The hind wings are red, with an undulated greenish-blue margin. The abdomen is blue-black, without any spots. This species varies considerably in having the spots more or less confluent or obliterated; and sometimes the spots are of a pale lemon-yellow colour, as in the specimen figured by Wood above referred to.

The caterpillar is greenish, with the sides marked by a broad yellowish stripe and a row of black dots, and the head varied with white. It feeds on the wild liquorice.

Mr. Stephens states that he has taken this species at Coombe Wood, on the 20th June, 1810, and near Darenth Wood. In France it has only been found on the borders of Switzerland. I introduced this and the two other species (A. Loti and Meliloti) on the authority of a statement made to me by Mr. Stephens, founded upon a careful comparison of German specimens brought over by Dr. Becker of Wiesbaden, with those in Mr. Stephens' own Cabinet, described in his Illustrations.

SPHINX PEUCEDANI of Esper has been introduced as a native species by Wilkes, under the name of Sph. filipendulæ, from which it is at once distinguished by having the tips of the antennæ white, and a red belt across the abdomen. It is figured by Wood in the Index Entomologicus, t. 53, fig. 21, amongst the doubtful British species.

FAMILY IV.

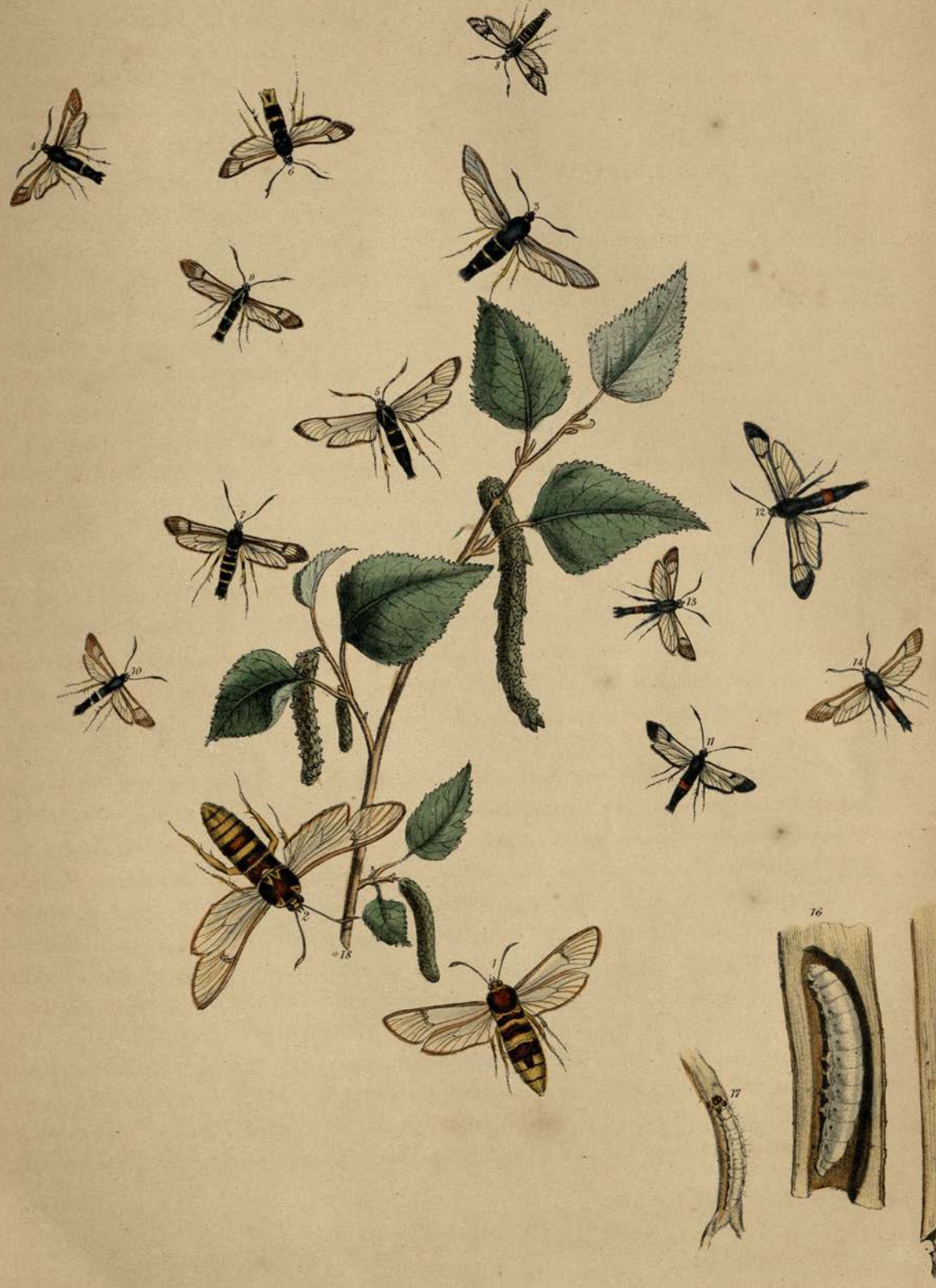
TROCHILIIDÆ, WESTWOOD.

(*Ægeriidæ*, Stephens, Newman, Westwood, olim.)

This family consists of a number of very interesting insects, remarkable for their great resemblance to various Hymenoptera and Diptera, owing to the elongate form of the body and the nakedness of the wings, which are more or less transparent in most of the species. The antennæ are simple, fusiform or thickened towards the tips, and generally terminated by a small pencil of hairs. The ocelli are distinct, and the labial palpi have the second joint long and slender, and the last distinct and pointed at the tip. The spiral tongue varies in length, being not longer than the palpi in Sphecia. The legs are long, and the posterior are furnished with very long spurs. The abdomen generally terminates in a brush, capable of opening and closing at will; the veins of the wings are comparatively few in number.

The larvæ of these moths are fleshy grubs of a cylindrical form, with naked bodies, destitute of a caudal horn. They have six pectoral, eight ventral, and two anal feet. They live in the interior of the branches or roots of trees, of the débris of which they construct a cocoon, or at least a partial one. The chrysalis has the ventral segments armed with transverse rows of recurved points, whereby it is enabled to push itself through the cocoon, and half out of the hole in the stem which the larva had previously made, having had the instinct to turn in its burrow, so that the head of the pupa may be towards the orifice. The perfect insects differ in their habits, some being exceedingly active, flying about in the hottest sunshine or basking on the leaves, alternately expanding and shutting their fan-tails; others, on the other hand (Sphecia), are extremely sluggish in the perfect state, resting on the trunks or leaves of the trees in which they have undergone their transformations, and flying heavily, a peculiarity analogous to that observed in the Smerinthi; in which, as in the genus in question, the tongue is almost rudimental.

These insects are especially worthy of remark, from the difficulties connected with their natural situation amongst the Lepidopterous tribes. The ordinary location assigned to them, with the other species of Linnæan Sphinges, solely as it should seem from the structure of their antennæ, and the analogical relations existing between them and the clear-winged Sesiæ, is disproved by their habits and transformations; in which latter respect they closely approach Cossus, among the Hepialidæ. Mr. Newman, indeed, on this account, introduced them into his "natural order Cossi" (including Hepialus, etc.); but there are so many characters in the imago state, in which these insects differ from all the rest of his Cossi (amongst which the veining of the wings may especially be mentioned), that I consider such a step to be an unnatural attempt to bind nature to a preconceived numerical system. Indeed, if these moths are forced amongst the Cossi, it would be equally natural to introduce the New Holland Cryptophasiæ, the internal feeding Noctuidæ, or even many of the Tineidæ. Mr. Newman himself, in fact, admits, that "after all, so weak are the bonds of alliance, so far removed the only supposable approaches, that the family must be considered the most isolated that natural history affords;" and we consequently find in his 'Grammar,' that he has (without comment) separated them from the Cossi, into a distinct natural order.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The family comprises only two British genera, it being equally contrary to nature to regard the slight characters by which the smaller species are distinguished from each other (such as the variation in the shape of the fan-tail) as of equal value with those which separate the two larger species from the rest. This has, however, also been done by Mr. Newman in the Entomological Magazine, (vol. i. p. 73,) in an attempt to illustrate his septenary system, by showing its applicability in the classification of insects, down to the genera and species of the present family. Having, in the former volume of this work, especially investigated the distribution and nomenclature of the genera of lepidopterous insects, it has become necessary in the present place to notice Mr. Newman's arrangement, in its details. No one has hitherto done this, which may lead to an impression of the unquestionable, because unquestioned, truth of the arrangement, just as the quinary analysis of the Lamellicorn beetles of Mac Leay has been over and over again assumed to be true, because no one competent to the task has taken its revision. It would have been uncandid to an author of acknowledged reputation, to have passed over his memoir on the present family without remark; but at the same time I am compelled to state my conviction, that Mr. Newman has entirely failed in his attempt to prove the septenary system, by his arrangement of these insects. It must be borne in mind, however that this conviction, and the remarks I have been compelled to make in its support, are quite independent of the question, whether Mr. Newman's system be or be not that of nature.

I regret that I am compelled, in adherence to the rigid law of priority, to reject Mr. Stephens' name for the present family. Scopoli is the author who is entitled to the credit of having first separated these insects from the mass of Linnæan Sphingidæ, namely, in 1777. Fabricius in all his works (except the last) united them as aberrant species of Sesia; which name Laspeyres in 1801 improperly confined to them alone, and his nomenclature has been followed by the German and French entomologists up to the present day. Fabricius, however, in his last work, adopted the present group, as first proposed by Scopoli; but instead of using the name Trochilium, he proposed that of Ægeria, which Dr. Leach adopted for the whole family; but Mr. Stephens, when he separated them into two genera, inappropriately employed the two precisely synonymous words for the two groups. On account therefore of the priority of the name Trochilium, as well as because it is very applicable for the majority of the family, from which in fact it was characterised, I propose to employ it in future for the family name, by giving to it the ordinary family termination.

DESCRIPTION OF PLATE VII.

INSECTS.—Fig. 1. Sphecia Bembeciformis. 15. The Caterpillar and Chrysalis.
„ Fig. 2. Sphecia Apiformis. 16. The Caterpillar.
„ Fig. 3. Trochilium Vespiforme.
„ Fig. 4. Trochilium Chrysidiforme.
„ Fig. 5. Trochilium Sphegiforme.
„ Fig. 6. Trochilium Cynipiforme.
„ Fig. 7. Trochilium Ichneumoniforme.
INSECTS.—Fig. 8. Trochilium Philanthiforme.
„ Fig. 9. Trochilium Tipuliforme. 17. The Caterpillar.
„ Fig. 10. Trochilium Andrenæforme.
„ Fig. 11. Trochilium Myopæforme.
„ Fig. 12. Trochilium Culiciforme.
„ Fig. 13. Trochilium Stomoxyforme.
„ Fig. 14. Trochilium Formiciforme.
PLANTS.—Fig. 18. Betula alba (common Birch).

The whole of the insects in this plate are from specimens in the British Museum, with the exception of T. Stomoxyforme and T. Andrenæforme, from the cabinet of Mr. Stephens. The larvæ of S. Apiformis and S. Bembeciformis, are from Lewin's plate in the Transactions of the Linnæan Society; and the larva of T. Tipuliforme from Hübner. H. N. H.

SPHECIA, Hübner.

(*Trochilium*, Stephens, Curtis; *Ægeria*, Newman; *Trochilium*, p., Scopoli; *Ægeria*, p., Fabricius; *Sesia*, p., Ochsenheimer, Godart)

This genus is at once distinguished from the rest of the family by the larger size of the species of which it is composed. The abdomen is very robust and thickened, and destitute of a fan-tail (except a very minute one in the males); the spiral tongue is very short and almost rudimental; the palpi are moderately long, but curved obliquely upwards; the antennæ are rather short and thick, and pectinated in the males. To these characters must be added the diversity in the habits of the perfect insects already noticed in our observations upon the family. Notwithstanding these differences (which repose both upon structure and economy) the Hornet moths are still united into a single genus with the rest of the family, by most of the French and German writers. Hübner was the first author who separated them from the smaller species, under the excellent name employed above; given in allusion to their wasp-like appearance. Mr. Stephens, however, gave them the name of Trochilium, which Scopoli has used for the entire family. As, however, Scopoli alludes in his generic character to the tufted abdomen of most of the species, it is evident that he did not regard these insects as its types; his name Trochilium, proposed in allusion to the humming-bird, being moreover applicable only to the smaller species. Fabricius, again, placed the hornet moth, S. apiformis, at the head of his genus Ægeria; but it is evident that he did not derive his character therefrom, as he expressly says that the palpi are projecting, which is the character of the smaller species. Mr. Newman, notwithstanding this, reverses the nomenclature of the two groups as adopted by Stephens and Curtis, calling the hornet moths Ægeria, and the currant moth, etc., Trochilium; although in the character of his genera (Ent. Mag. 1, p. 73), he indicates the distinction in the palpi as of primary importance. In doing this, he was actuated by the consideration that the hornet moths were the types of the family; observing, "when the septenary system is thus reduced to units, as I may say, I find the largest species * is invariably the type or centre." I however ask any unprejudiced entomologist, whether the hornet moths can be considered as pre-eminently exhibiting the characters of the family, which, as expressed by almost every species, consist in the great activity of the insects, their elegant forms and tufted tails. The hornet moths, in fact, have precisely as little claim to be considered as the types of this family, as the death's-head moth has to be regarded as the prominent type of the Sphingidæ. Mr. Stephens, by his observation that the hornet moths approach in habit to the Bombycidæ, has clearly shown their aberrant character.

There are two British species of this genus, the synonymes of which have been greatly confused.

SPECIES 1.—SPHECIA APIFORMIS. THE HORNET MOTH.

Plate vii. fig. 2 and 16.

Synonymes.—*Sphinx apiformis*, Linnæus, Donovan, vol. 1, pl. 25; Lewin in Linn. Trans., vol. 8, pl. 3, fig. 1—5; Harris, Exposition, pl. 3, f. 7; Haworth.

Sesia apiformis, Fabricius, Laspeyres, Godart, Ochsenheimer, Zetterstedt, Dalman, (Zygæn. Suec.)

Ægeria apiformis, Fabricius, Newman.

Trochilium apiformis, Scopoli; Stephens; Curtis, Brit. Ent. pl. 372, fig. **; Wood, Ind. Ent. t. 4, f. 23; Duncan, Brit. Moths, pl. 13, fig. 1.

Sphecia apiformis, Hübner.

Sphinx trabroniformis, Wien. Verz.; Hübn. Sphinx, pl. 8, fig. 51; Ernst.

This fine species varies in the expansion of its fore wings from 19 to 22 lines, and is at once distinguished from

* Gigantic size, in fact, appears to me to constitute aberration rather than typicality.

the other species by the following characters. The general colour of the body is brownish-black; the head and palpi are orange-coloured. The thorax has a large orange patch on each side in front, and two duller ochre patches on the disc behind. The abdomen has the first and second joints black, except the base of the second, which is orange; the third segment orange, with the hind margin black; the fourth entirely dark brown; the fifth and sixth orange also, with the hind margin brown, the remainder orange. The margins of the wing are broader than in the next species, and ochre-brown. The antennæ are dark above, but ferruginous beneath; and the legs orange, varied with tawny.

The caterpillar is a thick whitish fleshy grub, which feeds upon the wood of the trunks of willow and aspen trees, to which it sometimes occasions great damage. The pupa is elongated, and of a dark chestnut colour. The caterpillar changes to the chrysalis in April, and the perfect insect is produced towards the end of June.

The Sesia Sireciformis of Laspeyres and Hübner is evidently described from specimens of this species which have become greased. S. Tenebrioniformis of Hübner and Esper appears also intended for similar individuals.

SPECIES 2.—SPHECIA BEMBECIFORMIS. THE LUNAR HORNET MOTH.

Plate vii. fig. 1 and 15.

SYNONYMES.—*Sphinx crabroniformis*, Lewin in Linn. Trans., v. 3, pl. 3, fig. 6—10; Haworth; (Sesia cr.—nec W. V. nec Fabricii, nec Hübneri, nec Laspeyresii); Donovan's Brit. Ins., v. 13, pl. 436. *Trochilium crabroniforme*, Stephens. *Sesia Bembeciformis*, Hübner, Sphinx, pl. 20, f. 98; Ochsenheimer. *Trochilium Bembeciforme*, Curtis, Brit. Ent., pl. 372, fig. *. *Egeria Bembeciformis*, Newman, Ent. Mag., i. 75.

The expansion of the wings in this species is less than in the preceding, varying from 18 to 20 lines. It is of a darker-ground colour, with a black head; the palpi above, yellow. The thorax has a narrow transverse line of the same colour on the neck; there are also two obscure patches of the same colour at the side of the scutellum. The abdomen has the first and second segments entirely, as well as the broad posterior margin of the third and fourth, black, the remainder of the fourth being dark-red brown; the remainder of the abdomen is orange-yellow, with the hind margin of the segments darker. The margins and ciliæ of the wings are narrow; the thighs are brown; the tibiæ very densely clothed with orange hairs.

The caterpillar is whitish, with a brown spot formed by the ocelli on each side near the legs. It feeds upon the wood of the sallow, occasionally committing much devastation in the osier-grounds, as we learn from Mr. Bree's Memoir, published in the new series of the Magazine of Natural History, vol. i. p. 19; (and see Loudon's Arboretum Britannicum, p. 1482; Lewin in Linn. Trans., v. iii.; and Blomer in Mag. Nat. Hist., 1st ser., No. 21.) The caterpillar spins its cocoon in November, but does not change to the pupa till May; and the imago appears in July.

It is much rarer than the preceding species. Darenth Wood, and near Newcastle, Norfolk and Suffolk, are recorded localities. The Rev. W. T. Bree has taken it near Dudley, and reared it from larvæ found near Coventry; and I have taken the males sitting sunning themselves on the leaves of osiers, on the Surrey side of Hammersmith bridge, and alternately raising and depressing the abdomen, but on the least approach of danger they fall to the ground.

The first notice of this species which I can find is that of Lewin in the Linnæan Transactions, where it appeared under the name of Crabroniformis. The same name had, however, previously been given in the Wiener Verzeichniss to the Linnæan apiformis; so that on that account alone it ought to be rejected, as it is a beneficial

rule that no synonymous name ought subsequently to be given to a genus or species distinct from that of which it is a synonyme. In this case, however, the confusion would be greatly increased if it should be used, as Fabricius gave the same name to a third species from Italy, which Laspeyres considered to be identical with Tr. Chrysidiforme; whilst Hübner applied the same name in in his Beytrage to a fourth species with opaque fore wings, which he subsequently altered to S. Rhingiæformis. Four distinct species have thus received the same specific name.

TROCHILIUM, Scopoli, (pars typica.)

(*Ægeria, pars typica*, Fabricius, Syst. Gloss. *Ægeria*, Stephens; Curtis. *Sesia p.* Laspeyres; Ochs.; God. etc.)

This genus has the antennæ longer and more slender than in the preceding, gradually thickened from the base towards the tip, which is suddenly acuminated and curved; the last joint being furnished with an apical pencil of hairs; in the males they are more or less ciliated or pectinated; the palpi are longer than the head and porrected; the spiral tongue is nearly as long as the entire body, which is long and more or less slender, and terminated by a fan-tail, varying in size and shape; the wings are often more or less fenestrated or transparent. In their habits they are equally distinct from the preceding genus, being exceedingly agile, and flying about in the hottest gleams of the sun with the greatest activity amongst the leaves on which they occasionally settle; at such times elevating and depressing the body, and expanding or closing their fan-tails.

I must refer to my observations upon the family and preceding genus for the reasons which induce me to adopt Scopoli's name for these insects, and to retain them as a single genus.

Some of the species differ from the remainder in having the fore wings entirely clothed with scales; and it has been proposed to form them into a distinct genus (Memythrus Newm. Sph. Vesp. p. 53). But such a step appears to me to be unnatural, because it happens that in an American species the males have the fore wings fenestrated, whilst in the females they are opaque, (Ægeria exitiosa *Say*, an insect exceedingly destructive to peach-trees.) Mr. Newman denied the correctness of this fact, which has, however, been confirmed to me both by Mr. E. Doubleday and Dr. Harris, to which latter gentleman I am indebted for specimens. Analogous to what has already been mentioned as occurring in the clear-winged Sphingidæ, Laspeyres mentions the interesting fact, that when these insects first leave the pupa case, their wings are not hyaline, but are clothed with a fine powder, which rubs off with the greatest facility.

The species are rather numerous, and have been formed into six genera, by Mr. Newman. It appears to me more natural to adopt the sections which are given by Mr. Stephens, which, indeed, rest upon comparatively and equally slight characters.

"A. Antennæ much shorter than the body, in the males distinctly pectinated, anterior wings nearly clothed with scales; abdomen robust." (Memythrus, Newman. Paranthrene, Hübner; Newm.)

SPECIES 1. TROCHILIUM VESPIFORME.

Plate vii. fig. 3.

SYNONYMES.—*Sphinx Vespiformis*, Linnæus (not *Sesia Vespiformis*, Laspeyres; *Ægeria* v. Curtis, etc.)

Memythrus Vespiformis, Newman in Sph. Vesp.

Paranthrene Vespiformis, Newm. in Ent. Mag., 1, 83.

Sphinx (or Sesia) Asiliformis, Hübner; Fabricius; Laspeyres; Haworth; Donovan, Brit. Ins. v. xi. pl. 384. Kirby and Spence, Introd. v. 1, pl. 3, fig. 2, 3rd edit.

Ægeria Asiliformis, Stephens; Curtis; Duncan, Brit. Moths, pl. 13, fig. 2; Wood, Ind. Ent. t. 4, f. 25.

Paranthrene Asiliformis, Hübner, Verz. bek. Schmett.

Sphinx Tabaniformis, Borkh. (var.)

Sphinx Œstriformis, Kirby and Spence, Introd. vol. 1, pl. 3, f. 2, 1st edit.

This is the largest British species, varying in the expansion of its wings from an inch to an inch and a quarter. It is further distinguished by having the fore wings covered with dark scales; it is of a blue-black colour, with a white line before the eyes; the collar is yellow, as are also the tips of the palpi. The thorax has a lateral stripe and a spot of yellow, at the base of the fore wings. The abdomen has three equidistant, yellow fasciæ, and the tail has two longitudinal streaks of yellow. The femora are black, the hind ones yellow at the base; the tibiæ fulvous, and marked with a black spot on the outside, and the tarsi fulvous. The male differs in being smaller, with the antennæ decidedly pectinated, and in the abdomen having four belts, the alternate ones being very slender.

The larva of this species feeds, according to Oehlmann, on the wood of Betula alba. Borkhausen gives Populus dilatata as its food. The species (for the restoration of the specific Linnæan name* to which we are indebted to Mr. Newman, or rather to Mr. Bracy Clark, as stated by Lespeyres, and by Mr. Newman himself) is of very rare occurrence in England, but has been occasionally found in the woods of Surrey, Kent, and Middlesex, in the London district.

"B. Antennæ as long as the body; of the males generally ciliated; anterior wings with the disc hyaline."

"a. Abdomen more or less robust and abbreviated, fasciated with whitish or yellow."

SPECIES 2.—TROCHILIUM CHRYSIDIFORME.

Plate vii. fig. 4.

SYNONYMES.—*Sphinx (or Sesia) Chrysidiformis*, De Villars; Borkhausen; Laspeyres; Haworth; Esper; Hübner; Ochsenheimer.

Ægeria Chrysidiformis, Stephens; Curtis; Duncan, Brit. Moths, pl. 13, fig. 4. Wood, Ind. Ent. pl. 4, fig. 5.

Bembecia Chrysidiformis, Hübner, Verz. bek. Schmett.

Pyopteron Chrysidiformis, Newman, Ent. Mag. 1, 76.

Sphinx Hæmorrhoidalis, Cyrillo.

Sesia Crabroniformis, Fabr.

This handsome species measures ten lines in the expansion of the fore wings. It is of a blue-black colour; the last joint of the palpi is naked, and pale yellowish. (In my specimen I do not observe the peculiarity described by Mr. Newman, upon which his genus Pyopteron is founded.) The head has a white spot in front, and the collar is yellowish; the thorax has a few scattered yellowish hairs, and a white spot at the base of each of the fore wings; the abdomen has the fifth and last segment on the upper side margined with white; the fan-tail is black, with the middle yellow. The fore wings are saffron-coloured, with an elongated, hyaline patch in

* In the Linnæan description in the Systema Naturæ, the wings are described as fenestrated; and in the Fauna Suecica, as having a yellowish spot. This description, which has so much perplexed subsequent Lepidopterists, arises from the wings having been much rubbed. The observation of Linnæus, that it is twice the size of Tipuliformæ, at once disproves the conjecture of Laspeyres, etc., that it was intended either for Ichneumoniformæ or Cynipiformæ ♂.

the discoidal cell, and a rounded one towards the apex of the wing; the costa, apical margin, and a patch at the extremity of the discoidal cell, are black.

This species is extremely rare, only one specimen being said to have been taken in this country by Francillon, from whose collection it was purchased by Mr. Haworth. At the sale of the collection of the last-mentioned entomologist, it and numerous other very rare British Sphingidæ were purchased by Mr. Warburton. It occurs plentifully in Germany and the north of Italy. [Mr. Stephens introduces it amongst the reputed British species, in his recently published list of the Lepidoptera of the British Museum collection.]

SPECIES 3.—TROCHILIUM ICHNEUMONIFORME.

Plate vii. fig. 7.

SYNONYMES.—*Sphinx (or Sesia) Ichneumoniformis*, Fabricius; Borkhausen; Laspeyres.

Ægeria Ichneumoniformis, Curtis, Brit. Ent. pl. 53. Stephens, Wood, Ind. Ent. pl. 4, fig. 30.

Bembecia Ichneumoniformis, Hübner, Verz. bek. Schm.; Newman.

Sphinx Vespiformis, Hübner, Sph. fig. 39. Esper; Ernst; Haworth (but not of Linnæus nor of Laspeyres.)

Sphinx scopigera, Scopoli.

This rare species measures nearly an inch in the expanse of its wings. It is of a brownish-black colour; the head has a white patch in front, and the collar is yellowish, as are also the palpi, of which the tips are brownish; the antennæ have the middle part yellowish above, but ferruginous beneath in the female, but darker in the male; the thorax has a lateral line, and a slender transverse one near the base of the abdomen, yellow; the abdomen (which is not so slender as in many of the species) has six or seven yellow dorsal fasciæ in the male, but only five or six in the female; the fan-tail is small and black, but marked with a few yellow hairs, forming two lines. The wings are hyaline, with the margins and discoidal spot orange-brown; the posterior margin and apex of the upper wings orange; the tibiæ and tarsi are orange, with a black spot near the tip of the former. In wasted specimens the colours become paler, which agree with the Fabrician and other descriptions.

This species has generally been found in various parts of the south of England, Hastings, Devonshire, Teignmouth, and in the Isle of Wight by Mr. Weaver, (who informs me that he took several near Freshwater Gate, hovering over a yellow flower;) near Bristol, at Creak, on the coast of Norfolk.

SPECIES 4.—TROCHILIUM CYNIPIFORME.

Plate vii. fig. 6.

SYNONYMES.—*Sphinx (or Sesia) Cynipiformis*, Esper; Borkhausen; Haworth; Ochsenheimer.

Ægeria Cynipiformis, Stephens, Ill. Haust. pl. 11, fig. 2, male. Wood, Ind. Ent. pl. 4, fig. 29, male and female.

Synanthedon Cynipiformis, Hübner, Verz. bek. Schm.

♀ *Sphinx (or Sesia) Œstriformis*, Esper; (Der Naturforscher, St. vii.) Borkhausen; Hübner; Ernst; Haworth.

Synanthedon Œstriforme, Newman.

Sphinx Asiliformis, Borkhausen. (Der Naturforscher, St. vii.)

Sphinx Vespiformis, Fabricius; Turton; Curtis; Leach, (Æg. v.) but not of Linnæus.

Sphinx Chrysorrhœa, Donovan, Brit. Ins. 4, pl. 116. Stewart.

Sphinx Tipuliformis, Berkenhout.

Sphinx Tenthrediniformis, Hübner (teste Curtis); Haworth; Prodr.

This beautiful insect measures from ¾ to nearly an inch in the expansion of the fore wings. It is blue-black, the head with a white stripe in front, and the collar is yellow, as are also the palpi, which have a black line on the outside. The thorax a yellow strip on each side, and the breast has a yellow spot on each side; the abdomen with a mark at the base, and three yellow bands, the last of which is double in the male; the fan-tail in the female broad and yellow, but narrow and black above in the male. The wings have the veins and margins brown, glossed with blue and fulvous, and a transverse, lunate, central spot of orange margined with black on

the outside. The tibiæ and tarsi are yellow, the former with a ring of black near the tips. In some specimens the first segment of the abdomen has a yellow patch on each side, and between the second and third fasciæ is an indistinct slender line of yellow scales.

Various localities are recorded for this species (the sexes of which are so much unlike). It has been taken in the woods of Surrey and Kent, in the London district, near Cheltenham, in the Clapham Park Wood, Bedfordshire; and my specimen was obtained by Mr. Weaver, with others, from Shropshire.

I have followed Ochsenheimer and Stephens in the nomenclature of this species, it being customary in cases where the sexes have been described under different names to elect that of the male, although that of the other sex may have the priority in point of date.

The larvæ is whitish, with a brown head, and is found under the bark of the oak and birch; the imago appears in June.

SPECIES 5.—TROCHILIUM TIPULIFORME.

Plate vii. fig. 9.

SYNONYMES. — *Sphinx* (*Sesia or Ægeria*) *Tipuliformis*, Linnæus; Fabricius; Donovan, Brit. Ins. v. 2. pl. 52, 53. Haworth; Stewart; Harris, Exposition, pl. 111, fig. 8. Stephens; Curtis; Wood, Ind. Ent. t. 4, f. 32. Hübner; Esper; Ochsenheimer; Laspeyres, etc.
Trochilium Tipuliforme, Scopoli; Newman.
Bembecia Tipuliformis, Hübner, Verz. bek. Schm.

This, the commonest British species in the genus, varies in the expansion of its fore wings, from eight to ten lines. The colour is blue-black; the palpi are yellow; the antennæ black; the thorax with a yellow line on each side; the breast with a yellow lateral spot; the abdomen of the females with three and the males with four very slender transverse fasciæ. The tibiæ are black, with a ring, and the tips yellow; the fore wings have the margins and tranverse bar black, the tip dirty golden colour, with black veins.

The larva is of a whitish colour, with the head and feet brown, and a dark dorsal line. It feeds on the pith of the common currant-tree. Some which I found in the larva state in April had changed to pupæ in the middle of May, and appeared in the perfect state on the 9th of June. The moth is exceedingly active, and delights to settle on the broad leaves of the currant in the hot sunbeams.

SPECIES 6.—TROCHILIUM PHILANTHIFORME.

Plate vii. fig. 8.

SYNONYMES. — *Sesia Philanthiformis*, Laspeyres; Ochsenheimer; Wood, Ind. Ent. pl. 4, fig. 31.
Sesia Muscæformis, Vieweg; Esper; but not of Borkhausen.
Trochilium Muscæforme, Newm., Ent. Mag. 1, 79. Stephens, Illust 4, p. 385.
Æg. Ichneumoniformis, var.; H. Doubleday.

The expansion of the fore wings is ¾ of an inch. The colour is black; the palpi are whitish, with a line on the outside, and the tips black; the antennæ brown, paler in the middle, but black at the tips; the thorax has a stripe of luteous on each side; the abdomen black, with five or six yellowish belts; the fan-tail black, with yellow sides; the tibiæ black, with the middle and tips yellowish; the tarsi dirty yellow; the fore wings have the veins, margins, and transverse fascia black; there is also a second black transverse fascia, beyond which is a yellow patch.

Mr. Stephens states in his Illustrations, that his unique specimen of this insect was taken in Devonshire; [in his recently published list of Lepidoptera, in the British Museum collection, he, however, rejects it from the British list, and places it among the reputed species.]

SPECIES 7.—TROCHILIUM SPHÆGIFORME.

Plate vii. fig. 5.

SYNONYMES.—*Sesia Sphægiformis*, Fabricius; Wien. Verz.; Vieweg; Zetterstedt (Faun. Lapp. p. 918).
Trochilium Sphegiforme, Newm.
Sesia Spheciformis, Laspeyres; Borkhausen; Ochsenheimer; Dalman (Zyg. Suec. 218 4). Hübner, Sph. fig. 77 and 78. Ernst; Esper; Haworth; Villars.
Ægeria Spheciformis, Steph. Illust. H. 1, p. 11, fig. 1. Duncan, Brit. Moths, pl. 13, f. 3. Wood, Ind. Ent. t. 4, f. 27.
Bembecia Spheciformis, Hübner, Verz. bek. Schm.
Sphinx Ichneumoniformis, Borkhausen.

This rare species measures an inch in the expansion of its fore wings. The body is of a blue-black colour, the palpi are black above and yellow beneath, with the tip blackish; the antennæ are black, with a whitish or yellowish bar on the upper side, near the tip. The thorax has a lateral yellow line; the breast has also a large lateral yellow patch. The abdomen has a spot at the base, on the upper side of the hind margin, and the third segment yellow. (Hübner and Stephens represent the basal spot as forming a transverse bar.) The fan-tail is broad and black. The fore wings have the margins and transverse mark and tip blue or brown-black; the tibiæ are black, with luteous spurs, the hind pair yellowish on the inside; the tarsi yellow dotted with black. The perfect insect is found in woods in June and July, and the larva is described by Laspeyres as feeding on the wood of the birch. It is very rare in this country, a few specimens having been taken in the woods to the north of London. Mr. Weaver informs me that he took one flying in the New Forest, which at first sight he thought was a large ichneumon.

SPECIES 8.—TROCHILIUM ANDRENÆFORME.

Plate vii. fig. 10.

SYNOMYMES.—*Sesia Andrenæformis*, Laspeyres, Ses. Europ. p. 20, fig. 7, 8.
Trochilium Allantiforme, Newman, Ent. Mag. 1, 79.
Ægeria Allantiformis, Stephens, Ill. H. 4, p. 385. Wood, Ind. Ent. pl. 4, f. 21.
Trochilium Allantiforme, Steph. List Lep. Brit. Mus.

This species measures 10½ lines in the expansion of its fore wings. It is blue-black, with the palpi yellow on the under side; the antennæ entirely black; the thorax black above; the abdomen black, with the *hind margins of the third and fifth segments pale yellow;* the fan-tail black, with the middle orange; the legs black; the tibiæ sprinkled with a few yellowish hairs; the tarsi fulvous, with the tips blackish; the fore wings with the veins, margins, and transverse fascia black.

A male specimen of this species was taken by Mr. Chant in a wood near Greenhithe, in July 1829, from which my description was shortly afterwards taken, also a male by Mr. Harding, like Wood's figure 1515. I mention this because Mr. Newman, whose description was also taken from the same individual (which he states to have been the only British specimen he had ever seen or heard of), describes it as having only one white belt. It is, however, represented by Wood as having two; thus confirming my note made several years before that work was published. It is on this account that I refer it with scarcely any doubt to the S. Andrenæformis of Laspeyres. Mr. Newman, however, suggests that this may be the male of the S. Scoliæformis of Borkhausen and Laspeyres, but that is one of the largest in the genus, differing, moreover, in a number of its characters.

Mr. Stephens states that he possesses a much-injured specimen, found near Dover.

"b. Abdomen very slender in the middle in the males, and marked with a single red belt. (Conopia.)"

SPECIES 9.—TROCHILIUM FORMICÆFORME*.

Plate vii. fig. 14.

SYNONYMES.—*Sphinx (or Sesia) Formicæformis*, Esper?; Borkh.; Laspeyres; Ochsenheimer.
Ægeria Formiciformis, Curtis; Stephens; Wood, Ind. Ent. pl. 4. f 36. Haworth; Villars (Sphinx f.)
Sphinx Culiciformis, Scopoli, nec Linn.
L'Ichneumoniforme, Ernst.
Sphinx Nomadæformis, Hübner, but not of Laspeyres, etc. (male).
Sphinx Tenthrediniformis, Esper; Borkhausen (fem.)

This pretty species varies in the expansion of its wings from 8 to 10½ lines. It is blue-black, with a silvery line before the eyes; the palpi black above, fulvous beneath. The thorax and breast unspotted; the abdomen with the fourth segment entirely fulvous; the fifth with a few fulvous scales. The fan-tail marked beneath and at the sides with white hairs. The hind tibiæ annulated in the middle, and at the tip with white. The fore wings with a fulvous red patch at the tip. The veins, margins, and fasciæ black.

This is rather an uncommon species, but has occurred occasionally near London. Mr. Vigors is stated to have reared it from an apple-tree grown at Little Chelsea, and to have obtained it from Ireland, but I learn from Mr. Child of Birmingham, that he reared this species (of which I have a note) from willow. Hübner also describes the larva as subpubescent; whitish, with the head and tail brownish, adding with a doubt that it inhabits the branches of Salix alba; so that perhaps Mr. Vigors' specimens, bred from an apple, were another of the red-belted species. I took it on the 5th of July, 1827, on Umbelliferæ in Battersea fields. Mr. Haworth gives the beginning of August as its period.

SPECIES 10.—TROCHILIUM CULICIFORME.

Plate vii. fig. 12.

SYNONYMES.—*Sphinx Culiciformis*, Linnæus, Borkhausen, Laspeyres, Ochsenheimer, Esper, Zetterstedt, Godart, Boisduval.
Ægeria Culiciformis, Stephens, Ill. H. vol. 1, pl. 10, f. 3; Curtis; Wood, Ind. Ent. pl. 4, f. 34.
Conopia Culiciformis, Hübner, Verz, bek. Sch., Newman.
Sphinx Stomoxyformis, Hübner, Sphing., t. 7, fig. 47 (teste Laspeyres, but denied by Boisduval, who gives them as distinct, and omitted by Stephens, Lep. B. M. 1850, p. 33.)

This species is at once distinguished by the palpi, which are fulvous beneath in both sexes, a character expressly mentioned by Linnæus, which enables us to settle the very disputed synonymes of various species to which the name Culiciformis has been applied. The expansion of the wings varies from ten lines to an inch (our figure 12 is therefore somewhat enlarged beyond the natural size). It is blue-black; the palpi are fulvous beneath, a white line before, and a white spot behind the eyes; the thorax unspotted above, but with a fulvous spot on each side the breast; the abdomen with the fourth segment entirely fulvous red; the fan-tail entirely black; the wings hyaline, with the margins and transverse bar black, in certain situations glossed with blue, the apex somewhat violet; the cilia brown; the legs blue-black; the spurs yellowish, and the tarsi dirty white. The male differs in its smaller size and ciliated antennæ. The larva is dirty white, subpubescent, with a brown head; it feeds upon the wood of the plum and apple. The chrysalis is elongated and brown.

This species is also far from common. It has, however, been taken in the woods round London, at Gravesend, and Dublin. Mr. Haworth did not discriminate it from the next species.

* I adopt this form in preference to Formiciforme, because I believe it has the priority. If it be more classical ("Formica, not Formicus, being the generic name whence the present trivial name is derived," as Mr. Newman informs us), I do not understand why the names Vespiformis and Tipuliformis should be retained.

SPECIES 11.—TROCHILIUM MYOPÆFORME.

Plate vii. fig. 11.

SYNONYMES.—*Sphinx Myopæformis*, Borkhausen; Newman, (Conopia My.)

Sesia Mutillæformis, Laspeyres; Stephens; Curtis; Wood, Ind. Ent. tab. 4, f. 33; Ochsenheimer, Boisduval.

Sphinx Culiciformis, Hübner, Sphing., pl. 7, fig. 45; Haworth; Esper.

Sph. zonatus, Donovan, Brit. Ins., vol. 6, pl. 195; Stewart, Turton.

This species is very closely allied to the preceding, but is at once distinguished by the colour of the palpi, The expansion of the fore wings varies from eight to ten lines. It is of a blue-black colour; the head has a very slender white line before the eyes; the palpi are entirely black in the female, but in the males they are white on the underside; the thorax is unspotted above; the breast has a large fulvous patch on each side. The abdomen has the fourth segment fulvous red; this *segment on the underside in the female is black, with a white margin;* but in the male it is entirely white, as well as the extremity of the abdomen. The fan-tail is unspotted, the markings on the wings are black; the tibiæ blue-black, and the tarsi paler.

This species is the most abundant of the red-belted kinds in gardens round London in May and June. I belive it was this species which Mr. Vigors reared from the apple-trees in his garden, in Whitehead's Grove, Chelsea. Mr. Newman thinks it probably feeds on the pith of the Rubus idæus. Near Hertford, Ripley, and Dublin, are mentioned as its localities by Mr. Stephens. I have taken it in a sand-pit near Woolwich (at the beginning of June 1822), and in other places in the neighbourhood of London.

SPECIES 12.—TROCHILIUM STOMOXYFORME?

Plate vii. fig. 13.

SYNONYMES.—*Ægeria Stomoxyformis*, Stephens, Ill. Haust. 4, p. 143, pl. 11, fig. 4; Wood, Ind. Ent. pl. 4, fig. 35.

Sphinx Stomoxyformis, Hübner, Sph. pl. 2, f. 47 ♀; Haworth, Ent. Trans. 1, 334??

Conopia Myopæformis ♀, teste Newman.

Expansion of the wings 11½ lines. "Blue-black head, with a slender silvery line before the eyes; *palpi totally black;* thorax glossy *immaculate;* breast with a fulvous patch anteriorly; abdomen shining, with the fourth segment above bright fulvous orange, *interrupted by a broad dusky black line beneath,* caudal tuft immaculate; femora blue-black, tibiæ the same, the anterior yellowish within; the spines black; tarsi blue-black above, yellowish beneath; anterior wings above, with the base, costa, nervures, a broad transverse line, and the apex, deep bluish-black; beneath with the costa at the base, the margins of the discoidal line, and the space between the nervures at the apex (which are very broad and dusky-blue), bright golden fulvous; posterior, with the nervures, margin, and anterior lunules, bluish-black; beneath the same, with the costa slightly margined with fulvous." This is Mr. Stephens' description of "a single specimen in beautiful condition," which he conjectures to have been taken at Darenth, having been informed that Mr. Chant possessed a pair captured there on the 10th July, 1825, and that Mr. Davis found a specimen at Gravesend. Hübner figures *his* Stomoxyformis with two red stripes on the thorax; and Mr. Stephens' Latin character accords therewith, but not with the English character which he gives. Moreover, in the description of his plates, Mr. Stephens states the specimen figured by him to be a female. Mr. Newman, however, having "carefully examined the specimen described and figured by Mr. Stephens, and also those in the cabinets of Mr. Davis and

Mr. Chant," gives the Stomoxyformis of Stephens, as the female of Myopæformis; whilst, to add to the confusion, Mr. Stephens (Illustr. Mand. v. 4, p. 69) censures a "reference to my *male* Ægeria stomoxyformis, *with ciliated antennæ*, as the female of Æg. culiciformis.

If, as Mr. Stephens at first stated, his specimen be a female, then the only difference which I can find between his descriptions of it, and of the female of the preceding species, is the colour of the under side of the fourth abdominal segment; but in such case, Mr. Stephens' description does not accord with Hübner's insect. If, on the other hand, the specimen in question be a male, then it is at once distinguished from all the other red-belted species by the colour of its palpi.

[Doubleday and Stephens (List Lep. Brit. Mus. p. 33, 1850) give the Stomoxyforme of the latter author as a variety of Tr. Myopæforme.]

SPHINX EPHEMERÆFORMIS of Haworth, referred to this genus by Haworth, Stephens, etc., belongs to another family. It is allied to Psyche, and has been subsequently described and figured by Mr. Stephens, from a drawing made by myself from Donovan's original specimen, under the name of Thyridopteryx, in the Transactions of the Entomological Society of London.

FAMILY V.—HEPIALIDÆ, STEPHENS.

(*Zeuzerides*, Boisduval; *Xyleutites*, Newman.)

This is the first family of the great division of night-flying moths, named by Linnæus, Phalæna, and is distinguished by having the antennæ generally short and filiform, never feathered to the tip; the spiral tongue either obsolete or very short; the palpi also generally obsolete; the abdomen elongated, as are also the wings, which are deflexed in repose, the anterior pair exhibiting a striking peculiarity in the disposition of the veins quite unlike that of any other group, but which has not hitherto been noticed by any previous writer, and which may partially be perceived in our figure of Zeuzera Æsculi (pl. 9, fig. 5). The female is often furnished with an exsertile ovipositor. The caterpillars are long, fleshy, naked grubs, with a few straggling hairs. They are sixteen-footed, having six pectoral, eight ventral, and two anal feet. They are generally nearly colourless, and feed on the wood of trees, or at the roots of vegetables. When full grown, they construct a loose cocoon of the materials upon which they have been feeding. The pupæ are elongated, and have the abdominal segments armed with transverse rows of fine reflexed spines or hooklets, which assist the insect in pushing itself out of its cocoon to the surface of the earth or the exterior of the tree—immediately before assuming the perfect state—the exuvia of the pupæ being found sticking in such situations.

This family, which is of small extent, is closely allied in respect to its transformations to the Trochiliidæ; but the relation with the Smerinthi, suggested by Mr. Stephens, appears to me to be but slight, there being other species of the Linnæan Bombyces which much more nearly approximate to these insects.

DESCRIPTION OF PLATE VIII.

INSECTS.—Fig. 1. Hepialus Hectus (the golden swift). 2. The Female.
„ Fig. 3. Hepialus Lupulinus (the small common swift). 4. The Female. 5. A Variety.
„ Fig. 7. Hepialus Humuli (the Ghost Moth). 8. The Female. 9. The Caterpillar.
„ Fig. 10. Hepialus Velleda (the map-winged swift). 11. The Female.
„ Fig. 12. Hepialus Sylvinus (the orange swift). 13. The Female.
„ Fig. 14. Hepialus Carnus? (H. velleda var teste Stephens, List Lep. Brit. Mus.)
„ Fig. 15. Anthrocera Trifolii.
„ Fig. 16. Anthrocera Meliloti.

PLANTS.—Fig. 17. Humulus lupulus (the common Hop).

H. Hectus varies considerably in the distinctness of its markings, and I have selected one of the most distinct, both for the male and female. H. Lupulinus varies so very much in its markings, that without examining intermediate specimens, one might be tempted to consider many of them different species; but the intermediate gradations easily convince of their identity. There is one variety, however, of a pale grey brown entirely without marks, of which there are several specimens in the British Museum, that appears sufficiently distinct to form a separate species, not only from its colouring, but also from a slight though constant and well-defined difference in the form of the wings. I have figured this variety at No. 5. For the female of H. Humuli I have selected a strongly-marked female, but this does not vary so much as other species. H. Velleda varies very considerably, but I have selected specimens in which the markings appear most true and perfect; it does not, however, vary so much as H. Lupulinus. H. Sylvinus varies more in size than in the character of the markings, which all preserve pretty perfectly the crescent in the anterior wings; but some of the females are even smaller than the male represented in this plate, though their general character is to be much larger than the males.

The whole of the above are drawn from the very fine series of specimens in the British Museum, except H. Carnus, which is from Mr. Stephens' plate. The caterpillars are Hübner and Harris.

The two Anthroceræ (omitted in plate vi.) are from the collection of Mr. Stephens. H. N. H.

HEPIALUS, FABRICIUS*.

The species of this genus, which from the rapidity of their flight are known by the name of Swifts, are at once distinguished from the other genera not only of this, but of nearly all other families of moths, by the extremely short antennæ, which are generally simple or slightly pectinated in the males of some of the species. The mouth is obsolete, the tibiæ are destitute of spurs, the wings long and somewhat lanceolate, with the veins singularly arranged (as represented, for the first time, in my "Modern Classification of Insects," vol. ii. p. 374, fig. 104—16), the hinder wings being of large size, and the body is long and slender. The larvæ feed upon the roots of grasses and other vegetables; they are long, fleshy, naked, and colourless, with sixteen feet. The pupæ have the abdominal segments furnished with transverse rows of reflexed points, whereby they push themselves to the surface of the earth, out of which they may occasionally be found with the anterior part of the body sticking above the surface.

* Fabricius (Phil. Ent., p. 112) gives ἡπίαλος, febris lenta, as the derivation of this name, which he places in the list of those names which express some peculiarity in the habit of the species included in the genus; evidently alluding to the remarkable alternating flight of the ghost moth. Illiger and Ochsenheimer consequently erred when they (followed by Sodoffsky in the Moscow Transactions for 1837) changed the generic name to Hepiolus, supposing it derived from ἡπίολος, Licht-motte, a moth which flies to the candle-light, which it is not the habit of these insects to do.

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SPECIES 1.—HEPIALUS HECTUS. PLATE VIII., FIG. 1 and 2.

SYNONYMES.—*Phalæna (Noctua Hecta)*, Linnæus; Donovan, vol. 8, pl. 274, fig. 3; Hübner, Bomb., fig. 208, 209.
Hepialus hectus, Fabricius, Godart, Haworth, Curtis, Stephens, Boisduval; Wood, Ind. Ent. pl. 5, fig. 5. 5.
Noctua nemorosa, Esper var.
Hepialus Jodutta, Haworth, female, (but possibly not of Schrank and Hübner, which Boisduval gives as a variety of H. Carnus.)
Gazoryctra hecta, Hübner, Verz. bek. Schm.
Chelonus hectus, Leach, MSS.

This elegant species varies from 1 to 1⅓ inch in the expansion of its fore wings, which in the males are of a brightish orange colour, with three rows of interrupted golden spots, margined with dark lines (whence its common name of the golden swift) running obliquely across the wing, and a small basal spot of the same colour; the middle fascia being most distinct but elbowed, and the spots of irregular size, and the third fascia consisting of small marginal dots; the hind wings dusky brown. The female has the fore wings dirty ashy-coloured, with the golden bars replaced by pale brown bars; the first and second being obscurely forked towards the front margin. The markings vary considerably in different individuals; and in fine specimens of the male, the hind wings are also spotted with golden colour.

The males of this species are remarkable for having the posterior tibiæ densely bearded with long hairs, and wanting tarsi; and it has been supposed that this structure most probably enables the individuals of that sex to perform their very curious pendulum-like flight. This species is not very uncommon in various parts of the country, and appears in June.

SPECIES 2.—HEPIALUS HUMULI. PLATE VIII., FIG. 7, 8, 9.

SYNONYMES.—*Phalæna (Noctua) Humuli*, Linnæus; Donovan, vol. 8, pl. 274, fig. 1, 2; Harris, Exposition, pl. 4, fig. a—d.
Hepialus Humuli, Fabricius; Stephens; Wood, Ind. Ent. pl. 5, fig. 1—1.
Gorgopis Humuli, Hübner, Verz. bek. Schmett.

The sexes of this curious but most abundant species differ from each other more remarkably in colour than almost any other species of British moths; the males having the wings on the upper side of a clear pearly white; while in the females the fore wings are of a fine yellow colour, with orange markings. It varies from 1¾ to 3 inches in the expansion of the fore wings, which in the males have a pale yellowish margin, and are dusky on the under side, with broad orange margins. The hind wings in the female are dusky at base, but become orange along the margin.

This species is found about the middle of June frequenting grassy places, over which the male may often be observed performing its singular pendulum flight; and as this is frequently perceived in old churchyards, the insect has obtained the name of the ghost moth. Like the preceding species, it is the males alone which fly in this curious manner; and in this sex the hind tibiæ are similarly furnished with a long brush of hairs, but the tarsi are not wanting. The caterpillar feeds on the roots of the common hop.

SPECIES 3.—HEPIALUS LUPULINUS. PLATE VIII., FIG 3, 4, 5.

SYNONYMES.—*Phalæna (Noctua Lupulina)*, Linnæus; Harris, pl. 22, fig. 1; Fabricius (Hepialus l.); Stephens; Curtis; Wood, Ind. Ent. t. 5, fig. 4. 4.; Boisduval.
Hepialus fuscus, Haworth. Variety.
Bombyx Flina, Wien. Verz.; Hübner, Bomb., fig. 210, 211.
Hepialus Angulum, Haworth. Variety.
Hepialus obliquus, Fabricius; Haworth. Variety.
Hepialus nebulosus, Haworth. Variety.
Phalæna hecta, Harris, pl. 22, fig. 1.
Gazoryctra Jodutta, Hübner, Verz. bek. Schmett.

This common dull-coloured insect varies from an inch to an inch and a half in the expansion of its fore wings, which are of a clay or fulvous colour in the males, with a longitudinal white line in the middle, towards

the base), a stripe composed of white spots extending from the base along the inner margin nearly to the tip, where it is united to an oblique bar of white spots, and beyond the latter is sometimes a row of marginal pale spots; the fringe is fulvous, and the hind wings are brown and unspotted. The female has the wings of a dirty brown colour, with dull white markings, nearly similar to those of the male. The species is, however, exceedingly variable, not only in the ground-colour of the wings, but also in the markings, which are sometimes entirely evanescent; the insect appearing then, as represented in fig. 5, of a uniform dirty pale brown colour. Several of these varieties were considered by Mr. Haworth as distinct species.

This very common species appears at the end of May in great abundance, flying about grassy banks with the greatest rapidity, without any of that peculiar undulation which so remarkably distinguishes the flight of the two preceding species. Boisduval also gives August as the time of its appearance.

SPECIES 4.—HEPIALUS VELLEDA. PLATE VIII., FIG. 10, 11.

SYNONYMES.—*Bombyx Velleda*, Hübner, Bomb. pl. 212, 233, 234; Esper; Haworth.
Hepialus Mappa, Donovan, vol. 10, pl. 36, fig. 3.
Hepialus Velleda, Haworth; Stephens; Wood, Ind. Ent. pl. 5, fig. 3. 3.
Phormacis flina? Hübner, Verz. bek. Schm.

This handsome species varies from 1¾ to 2½ inches in the expansion of its fore wings, which are much more variegated in their markings than in any of the other species—whence the English name of the species, the Map-winged Swift; the ground being of a brown colour, with livid and white markings; the fore margin marked with brown spots, and generally a row of irregular-sized white dots along the outer margin. The most conspicuous of the pale markings on the wings are a triangular spot, succeeded by a short central white dash, and a broad, very irregular, livid stripe, running from the base along the inner margin, and then curving upwards and running obliquely to the tip, where it is forked. The hind wings are orange-brown, without any markings; and the fringe of all the wings is yellowish, spotted with brown. The female is of a more uniform appearance than the male, the livid colour being wanting; the pale markings of the male being, however, traceable. As in all the other species, the markings vary considerably in size and breadth, as well as the depth of their colour.

This species has been found plentifully in Darenth Wood, Kent, as well as in various and distant parts of the country. It is by no means a common species.

SPECIES 5.—HEPIALUS CARNUS? PLATE VIII., FIG. 14.

SYNONYMES.—*Hepialus carnus*, Fabricius?? Curtis; Stephens, Ill. Haust. 2, pl. 13, fig. 1; Wood, Ind. Ent. pl. 5, f. 2. 2.
Hepialus Jodutta, Hübner, Bomb., pl. 50, f. 213?
Gazoryctra Jodutta, Hübner, Verz. bek. Schm.?

This species varies from 1⅔ to 2½ inches in the expansion of the fore wings, which are of a livid or ashy hue, with a row of ill-defined pale spots along the inner margin, connected with an irregular (but sometimes nearly straight) pale bar, which extends from the hind margin to the tip of the wings. The disc is also more or less clouded in streaks, with whitish and brownish, and is, moreover, marked with a whitish spot, occasionally margined with blackish. The hind wings are dark ashy-grey, with the fringe yellowish-grey, with darker spots. The female is much more obscurely coloured, but presents slight traces of similar markings to those of the male.

This species is regarded by Mr. Wailes (Ent. Mag. 1, 42) as an extraordinary variety of the last species, with which indeed it is frequently taken in company, especially in the north of England. M. Boisduval and Mr. Stephens, however, regarded them as distinct; and I followed their opinions. The English specimens, however, heretofore considered as the true H. Carnus, are now regarded by Messrs. H. Doubleday and Stephens as a variety of H. Velleda.

SPECIES 6.—HEPIALUS SYLVINUS. PLATE VIII., FIG. 12, 13.

SYNONYMES.—*Phalæna (Noctua) sylvina*, Linnæus; Harris, Exposition, pl. 4, fig. f.; Harris, Aurelian, pl. 22, fig. h—m.
Hepialus sylvinus, Ochsenheimer; Stephens; Curtis, Brit. Ent. pl. 185; Wood, Ind. Ent. tab. 5, fig. 6.
Hepialus crux, Fabricius (male).
Hepialus Lupulinus, Hübner, Haworth.
Triodia Lupulina, Hübner, Verz. bek. Schm.
Noctua fiina, Esper. Var.
Hepialus Hamma, Schrank, Hübner. (Variety.)
Hepialus angulatus, Fabricius (female).

This pretty species varies from one to nearly two inches in the expansion of the fore wings, which, from the rich fulvous or orange colour in the males, have caused the species to be named the Orange Swift; whereas they have a cinnamon-coloured ground in the females. There is an irregular and broad pale spot, margined with whitish, running from the base to the middle of the hinder margin of the fore wings in both sexes, uniting with an oblique irregular whitish bar, which runs nearly to the tip of the wing, having its interior dusky, and near the apex being forked. The disc has also a dark patch margined with white, and various darker clouds; and the fore margin is spotted with brown, margined with whitish; the base of the fringe is marked with an indented brown line. The hind wings are dark and unspotted. All the markings, as well as the ground colour of the wings, are liable to considerable variations. The species is moreover distinguished at once from all its congeners, by having its antennæ furnished with a single row of short furcations in the males, and serrated in the females.

This insect is of common occurrence in various parts of England, being found near London, Hertford, Birch Wood, Kent, near York, the Isle of Wight, etc. It appears at the end of the summer, and frequents grassy lanes and weedy banks.

DESCRIPTION OF PLATE IX.

INSECTS.—Fig. 1. Cossus Ligniperda. 2. The Caterpillar. 3. The Chrysalis.
„ Fig. 4. Zeuzera Æsculi. 5. The Female. 6. The Caterpillar.
„ Fig. 7. Zeuzera Arundinis. 8. The head of the Female.

PLANTS.—Fig. 9. Salix arenaria (the downy Mountain Willow).

The Cossus and the female Z. Æsculi are from fine specimens at the British Museum. The male Z. Æsculi is from a specimen taken in Torrington Square, now in the possession of Mr. White. Z. Arundinis is from Hübner's accurate figure; the female differs so slightly, that I have thought it sufficient to give the head (No. 8) to show the difference of the antennæ.

The larva of C. Ligniperda is drawn from nature; that of Z. Æsculi from Hübner. H. N. H.

COSSUS, FABRICIUS.

This genus is at once distinguished from the former by its large unwieldy size, and longer antennæ; and from the following, by having these organs furnished with a single series of pectinations, extending to the tip in the males, and serrated in the females, without a coating of down at the base. The body is squamose, and not woolly. The wings at rest are deflexed at the sides (like a roof). The palpi are distinct, and extend upwards, to the height of half the eyes; the hind wings are considerably smaller than the fore ones, and the veins are more regularly arranged than in either the preceding or following genus. The larva is a fleshy grub of large size and immense muscular power, with the back rather depressed, each segment having a scaly dorsal plate; from the singular scent which it emits in this state, it has received the name of the Goat-moth.

There are four European species of this genus. We however possess, in this country, only the following.

SPECIES 1.—COSSUS LIGNIPERDA. PLATE IX., FIG. 1—3.

SYNONYMES.—*Phalæna (Bombyx) Cossus*, Linnæus; Donovan, vol. 4, pl. 114; Albin, pl. 35; Wilkes, pl. 31; Harris, Aurelian, pl. 23; Haworth.

Cossus ligniperda, Fabricius; Stephens; Curtis, Brit. Ent. pl. 60; Wood, Ind. Ent. pl. 5, fig. 7; Duncan, Brit. Moths, pl. 14, fig. 2, 3.

Xyleutes Cossus, Hübner, Verz. bek. Schm., Newman.

This fine insect varies from $2\frac{5}{8}$ to nearly 4 inches in the expansion of the fore wings, which are of ashy-white clouded with brown, especially across the middle, and marked with an infinite number of slender, short, black, irregular streaks, forming a kind of network. The hind wings are brown, with darker and more obscure reticulations extending along the margins of the wings.

The thorax is ochre-coloured in front, pale in the middle, and with a black bar behind; the abdomen is brown, with the margins of the segments pale yellowish-grey, especially in the female.

The caterpillar is of a dull yellowish fleshy hue, with dark chestnut scales on the back of each segment; the head, and two triangular spots on the first segment of the body black; it is naked, having only a few short scattered hairs upon the segments. It chiefly feeds upon willows and poplars, but will attack various other trees, boring into the solid wood, on which it subsists, and thus doing great damage to the timber; indeed, young trees attacked by it are often rendered so weak that a violent gale of wind throws them down. This may be easily conceived, because when full grown it is as large as a man's finger. It forms a rough cocoon of the chips of wood which it has bitten to pieces, fastening them together with a glutinous secretion, and lining them with silk. The pupa has the head-case acute, and each of the abdominal segments is furnished with several rows of reflexed spiny hooks, which are of great service in enabling the pupa, shortly before arriving at the perfect state, to push itself through its cocoon, and to the surface of the tree; out of the aperture of which the exuvia may be seen partially sticking after the moth has escaped.

This is one of the largest European moths, and its larva has been supposed by many authors to have been the celebrated Cossus of Pliny, which was considered in his time so great a dainty with the Roman epicures. Its offensive smell, however, and the power it has of discharging a fetid fluid at its persecutors, which causes pain, render it questionable whether the true Cossus was not the larva of some large wood-boring beetle. This insect has, however, acquired greater celebrity from having been selected by Lyonnet, the prince of entomological anatomists, as the subject of his magnificent work, "Traité Anatomique de la Chenille qui ronge le Bois du Saule," 4to. The Hague, 1760; in which the structure of the caterpillar was most elaborately investigated in every point of view, whilst the anatomy of the pupa and imago are similarly (but not so completely) treated in his posthumous "Recherches sur l'Anatomie et les Métamorphoses de différents Insectes," recently published. It will be sufficient, in order to give some idea of the careful manner in which the anatomy of this caterpillar has been studied in this work, to mention that Lyonnet discovered not fewer than 4061 muscles in its body; 228 being attached to the head, 1647 to the body, and 2186 to the intestines, whereas in the human body only 529 have been discovered; so that this caterpillar possesses nearly eight times as many muscles as are contained in the human frame. I may refer the reader to Köllar's work on obnoxious insects, (translated by Miss Loudon,) for many details of the natural history of this insect.

The goat-moth is abundant in various parts of the country. It remains in the caterpillar state three years, the moth appearing in the months of June and July.

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ZEUZERA, LATREILLE.

This genus is at once distinguished by the antennæ of the males, which have a double series of pectinations extending only half the length of the antennæ; whilst in the females they are simple, and with the base woolly. The body is also woolly, and the wings more elongated than in Cossus. The palpi are very small, and the spiral tongue is almost obsolete. The veins of the wings offer a singular mode of distribution, the discoidal cell being divided into several areas, and terminated by several angulated veins. The caterpillar (in the typical species) has the body spotted. It feeds, like that of the goat moth, in the interior of trees, and, like it, forms a cocoon of chips of wood agglutinated together.

SPECIES 1.—ZEUZERA ÆSCULI. PLATE IX., FIG. 4, 5, 6.

SYNONYMES.—*Phalæna (Noctua) Æsculi*, Linnæus; Harris, Exposition, pl. 11, fig. 3, 4; Donovan, vol. 5, pl. 152.
Zeuzera Æsculi, Latreille; Stephens; Wood, Ind. Ent., t. 5, f. 8; Curtis, Brit. Ent., pl. 722; Duncan, Brit. Moths, pl. 15, fig. 1, 2; Westwood, Ent. Text Book, pl. 5, fig. 3.
Phalæna Noctua pyrina, Linnæus, F.S.; Haworth.

This beautiful insect, which from its markings has obtained the name of the wood leopard, varies from rather more than two to nearly three inches in the expansion of the fore wings, which are of a snowy-white colour, semitransparent, and marked with a great number of shining blue-black spots, which are more distinct in the females than in the males; the hind wings are similarly coloured, but the spots are less distinct; the veins of the wings are of yellowish ochre. The thorax white, with six large black spots; the abdomen banded with blue-black. The caterpillar is pale ochre-yellow, with a large scaly black patch on the segment following the head; each of the other segments is marked with a number of shining black spots, from each of which issues a short hair; the anal segment has also a dark patch above. It feeds on the wood of the elm, pear, apple, lime, horse chestnut, walnut, ash, beech, birch, hazel, etc., burrowing into it in the same manner as the caterpillar of the goat moth, to which indeed it is very similar in its habits. It is found in numerous parts of the country at the beginning of July, although nowhere abundant. In St. James's and Hyde Parks it is not uncommon in certain seasons, but it must be sought for early in the morning, as the sparrows consider the body as great a treat as the old Romans deemed the Cossi; their ravenous propensities being often indicated by the wings of the moth found at the bottom of the stems of the trees in which the moth had been reared. Many particulars relative to the habits of this insect will be found in Loudon's Arboretum Britannicum, p. 887, and in Köllar's treatise above referred to.

SPECIES 2.—ZEUZERA ARUNDINIS. PLATE VIII., FIG. 7, 8.

SYNONYMES.—*Bombyx Arundinis*, Hübner, Bomb. t. 47, f. 200, 201; Ochsenheimer, vol. 3, p. 98 (Cossus A.); Boisduval (Zeuzera A.); Stephens in Entomologist, p. 160.
Bombyx Castanea, Hübner, Beitrage, Esper, Ernst.

This species differs from the preceding not only in its small size, being only 1¼ inch in expanse, but also in having its fore wings of a dull uniform yellowish or ochreous-grey colour, somewhat like that of dry rushes, upon which plant the larva (which is figured by Boisduval in the "Collection Iconographique des Chenilles d'Europe") feeds. The fore wings in fine specimens have a few small dots or slight markings of a brownish

colour, and a dark streak towards the costa, more or less apparent, but which are occasionally entirely wanting; the hind wings are paler, and brownish in the male, but whitish-grey in the female. The head and thorax are of the same colour as the upper wings, the abdomen very long, and of a greyish-white colour. The female differs only in being of a large size, and in having the antennæ slightly dentated throughout the whole length, instead of being filiform at the tip, and cottony at the base, as in Z. Æsculi ♀.

The caterpillar has not the body spotted as in Z. Æsculi, and the pupa has a prominent point at the front part of the head, like that of Nonagria.

We are indebted to H. Doubleday, Esq., for the introduction of this addition to our Fauna, that gentleman having found a specimen floating on the surface of standing water in Whittlesea Mere, in the summer of 1842, since which period he has reared many specimens from the chrysalis state.

The appearance of this insect is very unlike that of the typical species; whence, as well as from the difference in the larva, pupa, and female antennæ, Boisduval thinks it probably belongs to a distinct genus. Having, however, carefully examined Mr. Doubleday's male with the male of Z. Æsculi, no material characters presented themselves to warrant its generic separation. The veins of the wings are differently arranged to those of the type as represented in our Plate 9, figure 5, inasmuch as the vein which closes the discoidal cell is simply arched instead of being several times angulated; but I find that the male of Z. Æsculi differs in this respect considerably from the female, and closely approaches the male of Z. Arundinis in the arrangement of these veins.

FAMILY VI.—BOMBYCIDÆ, Stephens.

(*Tribes, Bombycini*, and *Saturnides*, Boisduval, Gen. et Ind. Meth.)

This family corresponds with Latreille's section Bombycites, as established in the second edition of the Règne Animal, and comprises some of the most gigantic insects of the entire order, which are generally distinguished by the obsolete structure of the mouth, which is often destitute of palpi; and the maxillæ when present are so short and weak as to be useless for the ordinary purpose of a spiral tongue. The body is very thick and hairy; the antennæ of the males generally very strongly bipectinated to the tip; and the wings are large and broad, and either extended horizontally or deflexed at the sides. The thorax is not crested. The larvæ are sixteen-footed, having six pectoral, eight ventral, and two anal feet; they never inhabit portable cases, and their food consists of the leaves of various plants. They inclose themselves in cocoons of pure silk, frequently of a firm and rigid texture like an egg, and which is rarely subterranean. The pupæ are not armed with transverse rows of rigid reflexed points upon the abdominal segments. The males, according to Mr. Stephens, generally fly swiftly in the day-time, from about noon to about four or five o'clock in the afternoon, and again in the evening; but the females are very sluggish and inactive. The prevailing hues are grey, brown, or fawn-colour; and many of the larger species have the wings ornamented with eye-like transparent spots.

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DESCRIPTION OF PLATE X.

INSECTS.—Fig. 1. Saturnia Pavonia minor, male (Emperor moth). 2. The Caterpillar.
" Fig. 3. Eriogaster Lanestris, male (the small Egger moth). 4. The Caterpillar.
" Fig. 5. Cnethocampa Pityocampa. 6. The Caterpillar.
" Fig. 7. Pœcilocampa Populi, male (the December moth). 8. The Caterpillar.
" Fig. 9. Clisiocampa Castrensis (the ground Lackey moth). 10. The Caterpillar.
" Fig. 11. Clisiocampa Neustria, male (the tree Lackey moth). 12. The Caterpillar.
" Fig. 13. Trichiura Cratægi, male (the pale oak Egger moth). 14. The Caterpillar.
" Fig. 15. Odonestis Potatoria, male. 16. Female (the Drinker). 17. The Caterpillar.

PLANTS.—Fig. 18. Salix Russelliana. 19. Helianthemum vulgare. 20. Bromus sterilis.

In many instances in the present plate where the sexual differences were slight, I have only shown the male insect. In S. Pavonia minor the female is principally distinguished by paler colouring, and being somewhat larger in size. In E. Lanestris the female has the antennæ simple, and the tuft at the tail much larger and more compact. P. Populi differs only in size, the female being considerably larger, but with simple antennæ. C. Neustria is very variable; the sexes are much alike, except that in the female the antennæ are less strongly pectinated. In T. Cratægi the female is more dusky, and less distinctly marked.

All the insects in the present plate (with the exception of E. Lanestris from the British Museum) are from fresh and beautiful specimens, kindly furnished by Mr. H. Doubleday. The Caterpillars are from Hübner, except that of O. Potatoria, which is from nature. H. N. H.

SATURNIA*, SCHRANK. (ATTACUS, GERMAR, PAVONIA, HÜBNER.)

The moths of this genus pre-eminently take the lead of all the Linnæan species of Bombyx, on account of the large size of the exotic species, most of which have the wings large, rounded, and ornamented with eye-like and more or less fenestrated spots. The antennæ have each joint four-pectinated, the pectinations in the male being very long; the spiral tongue and palpi are obsolete, or very short and pilose. The collar is generally coloured like the fore margin of the wings. The abdomen is short and very robust. The larvæ of the European species are naked, each segment of the body girt by tuberculated rings, the tubercles emitting tufts of hairs. The pupa is enclosed in a pear-shaped cocoon, one end of which has the silken threads arranged with singular instinct to allow the egress of the perfect insect as soon as disclosed, and which yet prevents the entrance of other insects. The genus is very numerous in exotic species, the arrangement of which requires revision. We, however, possess only a single species.

SPECIES 1.—SATURNIA PAVONIA MINOR. PLATE X, FIG. 1, 2.

SYNONYMES.—*Phal.* (*Attacus*) *Pavonia minor*, Linnæus, Donovan, vol. 1, pl. 1 ♂, vol. 8, pl. 254 ♀; Albin, pl. 25, fig. 37 a—h; Wilkes, pl. 32, 33; Harris, Aurelian, pl. 25, fig. a—i; Wood, Ind. Ent., t. 6, fig. 39; Duncan, Brit. Moths, pl. 17, fig. 1, 2.

Bombyx Carpini, Borkhausen, Wein. Verz., Hübner, Ochsenheimer, Boisduval.

Pavonia Carpini, Hübner, Verz. bek. Schm.

Phalæna (*A.*) *Pavonia*, Linn. F. Berk., Steph. (Sat. P.)

This species, which from its beauty has received the name of the Emperor Moth, varies from 2½ to 3½ inches in the expansion of its fore wings, which in the males are of a grey-brown, but paler grey in the females; a pale oblique bar, bordered on each side with black, runs across near the base, succeeded in the centre by a pale oblong patch, within which is a beautiful black eye-like mark enclosing a yellowish ring, with a slender pale blue crescent. This is succeeded by a wavy fulvous stripe edged with black, and terminating in a black patch

* Saturnia, one of the names of Juno.

on the costa, beneath which is a white and red blotch, the margin of the wing being pale grey-brown, separated from the disc of the wing by a white submarginal streak. The hind wings are bright fulvous in the male, but grey in the female, with an ocellus in the centre similar to that of the fore wings, succeeded by a slender dark wavy line, then a pale wavy bar and a broad dark bar; the outer margin being dark-coloured, but separated from the disc of the wing by a white streak.

The caterpillar is yellowish-green with black bands, having gold-coloured tubercles emitting pencils of short bristles. It is found in the autumn feeding upon willows, apple, heath, etc. Mr. Haworth gives the middle of May and beginning of August as the times of its appearance in the winged state. It is sufficiently common throughout England.

The Continental PHALÆNA (ATTACUS) TAU, Linnæus, the type of Ochsenheimer's genus Aglaia (figured in Wood's Ind. Ent., t. 53, fig. 32), has the wings of a testaceous colour, with a large somewhat violaceous eye in the middle of each, the centre being marked with a white T. It was recorded by Martyn, in his Aurelian's Vade Mecum, as a British species, but no example is known.

The remaining insects included in the present family (comprising the remaining species upon plate 10, and all those represented in plates 11 and 12) constitute a natural division, and were united together by Ochsenheimer under the names of Gastropacha, his typical species being Ilicifolia, Populifolia, Quercifolia, etc. This group has been much divided by Mr. Stephens, chiefly from the characters of the preparatory states. Six of his genera (namely, the six following, comprising the remainder of plate 10, except figures 15, 16, and 17, and the whole of plate 11) have been reunited by Boisduval under the old generic name of Bombyx*, being, however, retained as sub-sections. The majority of these sub-sections, however, appear to me to be of equal value with the other groups—Odonestis, Dendrolimus, and Gastropacha.

ERIOGASTER, GERMAR. (DASYSOMA, HÜBNER.)

In this group the abdomen of the females is terminated by a thick woolly mass (whence both generic names, derived from the Greek). The body also is unusually stout, and the wings rather short and sub-diaphanous. The antennæ are moderately bipectinated in the males, and serrated in the females. The palpi are short and three-jointed. The larvæ are cylindrical, each segment with two dorsal setigerous tubercles. They are gregarious, inhabiting a common web, and form a compact egg-like cocoon on the surface of the ground amongst leaves.

SPECIES 1.—ERIOGASTER LANESTRIS. PLATE X., FIG. 3, 4.

SYNONYMES. — *Phalæna (Bombyx) lanestris*, Linnæus; Donovan, vol. 6, pl. 310; Albin, pl. 19, fig. 26 a—d; Wilkes, pl. 53; Harris, Aurelian, pl. 25, figs k— o.

Eriogaster lanestris, Germar; Stephens; Wood Ind. Ent., t. 6, f. 47.

Dasysoma lanestris. Hübner, Verz. bek. Schm.

This pretty species varies from $1\frac{1}{8}$ to $1\frac{5}{8}$ inch in the expansion of the fore wings, which are of a reddish-brown colour, with a distinct patch of white at the base, a smaller one in the middle; half-way between which

* The name Bombyx ought to be retained as the generic name of the silk-worm moth. The French, however, designate it by the name of Sericaria.

and the margin is an arched stripe extending across the wing, the margin being cinereous. The hind wings are pale grey or reddish-brown, with an indistinct central paler streak.

The caterpillar is black or brown, with two red setigerous tubercles on the back of each segment, a yellow line above the feet, and short transverse white stripes. They feed on the sloe and other fruit trees, whitethorn, etc., being full fed at the end of June; previously to this period they reside in company under a common web, whence they migrate during the night for feeding, but return before sunrise. They, however, separate to form their cocoons. The perfect insect appears in February and March, sometimes remaining several years in the chrysalis state. It is by no means a rare species.

CNETHOCAMPA*, STEPHENS. (THAUMETOPÆA, HÜBNER.)

This group has the wings rather elongated and sub-diaphanous; the body moderately thick, but tufted to the tip in the females; the palpi very short and three-jointed; the antennæ short, slender, and bipectinated in the males; the fringe of the wings elongate. The larvæ are cylindrical and hairy. They inhabit a common web in society, whence they emerge in *procession*, as described by Reaumur and other authors; and it is *within* this web that Cn. processionea undergoes its transformations. Cn. pityocampa and some other Continental species, on the contrary, bury themselves under ground.

SPECIES 1.—CNETHOCAMPA PITYOCAMPA. PLATE X., FIG. 5, 6.

SYNONYMES. — *Bombyx Pityocampa*, Fabricius; Hübner (Bombyx, pl. 36, fig. 161); Stephens; Wood, Ind. Ent., t. 6, f. 48. (Cneth. Pityo.) | *Thaumetopœa Pityocampa*, Hübner, Verz. bek. Schm.

The fore wings measure 1⅛ inch in expanse, and are of a greyish colour, with three undulated dark streaks, and a central dusky lunule; the hind wings whitish, with a dusky spot at the anal angle. The body is grey, with the abdomen fulvous brown.

The caterpillar is described by Fabricius as hairy, and of a blue-grey colour, with yellow spots on the back, and a black head. It feeds on pines and firs.

This species is introduced into the British lists on the authority of a single small specimen or variety in the British Museum, stated to have been captured by Dr. Leach, in Devonshire, in the summer of 1825. It is now, however (1851), rejected from the list of indigenous species by H. Doubleday and Stephens.

CNETHOCAMPA PROCESSIONEA (Linnæus; Wood, Ind. Ent., t. 53, f. 34), so named from the extreme regularity with which the caterpillars march from their nests during their feeding excursions, was introduced into our lists by Martyn and Stewart; but it is very questionable whether the species is indigenous. It is generally smaller than the preceding, with ashy-brown wings, with three dusky streaks, and a brown abdomen; the female having the markings more indistinct.

* Derived from the Greek, in allusion to the excessive irritation produced by the hairs of the caterpillars upon the naked skin.

PŒCILOCAMPA*, Stephens. (DIAPHONE, pars, Hübner.)

The wings in this genus are rather elongate and sub-diaphanous, but the abdomen is not furnished with a woolly mass at the tip. The antennæ in the males are strongly bipectinated, and of nearly equal breadth to the tip. The palpi are extremely minute. The larvæ are solitary in their habits, rather depressed, and but slightly pilose. They form a coriaceous suboval cocoon of silk at a little depth under ground.

SPECIES 1.—PŒCILOCAMPA POPULI. Plate X., Fig. 7, 8.

Synonymes.—*Phalæna (B.) Populi*, Linnæus; Donovan 9, pl. 307; Wilkes, pl. 48; Albin, pl. 85.

Pœcilocampa Populi, Stephens; Wood, Ind. Ent., pl. 6, fig. 46.
Diaphone Populi, Hübner, Verz. bek. Schmett.

The ore wings vary from 1½ to 1⅝ inch in expansion, and are of a purplish-brown hue, with the base and the slender inner margin brunneous, a buff stripe very much curved near the base, which does not extend to the inner margin, and a second one of the same colour considerably undulated beyond the middle; the fringe alternately grey and brown; the hind wings paler, with a slightly defined pale central stripe. The thorax dark brown, but pale in front.

The caterpillar is pale ashy, with the back darker coloured, each segment with two pairs of red spots. It is found in June on poplar-trees. The perfect insect, which is rather uncommon (although found in many distant parts of the country) makes its appearance in December; when, as Mr. Haworth remarks, it and several other winter moths form an essential part of the food of our soft-billed birds.

CLISIOCAMPA, Curtis. (MALACOSOMA, Hübner.)

This genus receives its systematic name on account of the gregarious habits of the caterpillars, which reside in a common tent or web; and the species are termed lackeys, from the red, blue, white, and black colours of the caterpillars, arranged in stripes like the dress of a footman. The abdomen is not tufted in the females; the antennæ of the males are short, recurved, strongly bipectinated in the males, and slightly in the females; the palpi minute and three-jointed. The wings are small in the males, acute at the tip, and not diaphanous. The caterpillars construct a loose silken cocoon suffused with a fine powder, having previously left the general web. The female has the instinct to arrange her eggs in an elegant spiral coil round the young branches of fruit-trees, on which the larvæ feed, often occasioning great injury to them.

SPECIES 1.—CLISIOCAMPA CASTRENSIS. Plate X., Fig. 9, 10.

Synonymes.—*Phalæna (Bombyx) castrensis*, Linnæus; Hübner, Bomb., fig. 177, 180.

Clisiocampa castrensis, Curtis, Brit. Ent., pl. 229; Stephens, Ill. Haust., plate 13, fig. 2; Wood, Ind. Ent., t. 6, fig. 49 and 49.
Malacosoma castrensis, Hübner, Verz. bek. Schm.

The fore wings when expanded measure from 1¼ to 1¾ inch, those of the male being of a pale straw colour, with two dull castaneous bars running across the middle of the wings, the inner one incurved towards the base

* Derived from the Greek, in allusion to the variegated colours of the caterpillar.

(sometimes united by a longitudinal mark), and often with a dull irregular waved streak; the hind wings fawn-coloured. The female has the wings dull fulvous chestnut, with two straw-coloured stripes forming a bar across the fore wings. It is, however, very inconsistent in its markings. The thorax is yellowish, and the abdomen clay-coloured in the male.

The larva of this species feeds on low plants, such as Artemisia maritima, Plantago lanceolata, and Daucus carota, on the sea-coast; hence termed the ground lacquey. It is of a leaden colour, the back black, with red streaks and red lines at the sides; the hairs yellow chestnut. The moth appears at the end of July and through August; but it is very rare, occurring on the coasts of Essex, Kent, Devonshire, the Isle of Sheppy, etc.

SPECIES 2.—CLISIOCAMPA NEUSTRIA. PLATE X., FIG. 11 and 12.

SYNONYMES.—*Ph. (B.) Neustria*, Linnæus; Donovan, vol. 3, pl. 95; Albin, pl. 19, fig. 27, e—l; Wilkes, pl. 45; Harris, Aurelian, pl. 17, fig. a—f.

Clisiocampa Neustria, Curtis; Stephens; Wood, Ind. Ent., pl. 6, fig. 50 and 50.

Bombyx bilineatus, Haworth (variety).

This very common and destructive species measures 1¼ to 1¾ inch in the expansion of its fore wings. It is very similar to the preceding both in size and shape, but the thorax is fawn-coloured, not yellowish; the wings more rusty fox-coloured, with two pale oblique stripes inclosing a darker coloured bar, the fringe spotted with yellow. The female, instead of being darker than the male as in the preceding, is lighter, with a similar but darker bar across the wings. The colours and markings, however, are very variable. The caterpillars are of a grey leaden colour, with three red lines on each side, and a white dorsal line. It is found in June, and in this state is one of the greatest pests our fruit-trees labour under, as they are sometimes quite defoliated by these voracious caterpillars, and covered over with their noisome webs. The eggs are hatched shortly after the leaves burst forth; and the caterpillars do not separate but live in one society, forming for themselves a common web, which they enlarge from time to time as they find necessary to accommodate their increasing sizes, communicating at length to the almost defoliated tree a very sickly and disagreeable appearance. The best way to destroy them is to shake the branches violently, either with the hand or a pole with a hook to it; this brings them quickly to the ground, when they are easily destroyed. Poultry will feed on them with avidity (Haworth). The moth appears in July and August, and flies with great rapidity.

TRICHIURA, STEPHENS. DIAPHONE, PARS, HÜBNER.

This group is distinguished by its short straight antennæ, its tail somewhat bifid in the males, and clothed with a dense mass of wool in the females (whence the generic name derived from the Greek), its fore wings short and opaque, and its hind ones rounded and entire; but it is in the preparatory states that it chiefly differs from several of the preceding groups, the eggs being deposited in rows on the trunks of trees, and coated with wool, stripped by the female from the extremity of her own body. The larvæ are for a short time gregarious, but do not form a common nest, and the cocoon is regularly egg-shaped and hard.

SPECIES 1.—TRICHIURA CRATÆGI. PLATE X., FIG, 13, 14.

SYNONYMES.—*Phalæna (Bo.) Cratægi*, Linnæus; Donovan, vol. 4, pl. 117; Albin, pl. 24, fig. 64, a—d, and 88, fig. i.
Trichiura Cratægi, Stephens; Wood, Ind Ent., pl. 6, fig. 45, 45.
Phalæna (Bo.) Vitis Idææ, Linnæus (female).
Diaphone Cratægi, Hübner, Verz. bek. Schm.
Bombyx Mali, Fabricius (B. Avellanæ, Fabr. Oliv.) Variety.
Bombyx pallidus, Haworth. Variety.
Bombyx Avellanæ, Fabricius. Variety.

The fore wings when expanded vary from 1 to nearly 1½ inch, and in the males are of a pale ashy colour, with a brown fascia before the middle of the wing curved inwards, a second beyond the middle, dentate and black, the space between these fasciæ being generally darker, with a black spot; there is also an indistinct dentate streak running near the margin, and a marginal row of black dots; the hind wings are mouse-coloured or brownish. The female has the wings brown, with two or sometimes three nearly obsolete waved whitish streaks beyond the middle. Pale varieties of the female occur with the markings nearly as in the male, which Mr. Haworth regarded as distinct under the name of B. pallidus. The larva is black, with yellow hairs, pale fasciæ, and an interrupted lateral row of white spots; each segment is also marked with several red tubercles. It feeds on the whitethorn in May, and the moth appears in September. It is a comparatively uncommon species, but occurs in the woods near London, Epping, Bedford, and elsewhere.

ODONESTIS, GERMAR. (COSMOTHRICHE, HÜBNER.)

This genus is at once distinguished from the preceding groups of this section of the family by the large size of the typical and only species, as well as by the elongated beak-like palpi, the slightly waved outer margin to all the short broad wings, the fore ones being acute at the tips, and the very strongly bipectinated antennæ in the males; the abdomen long and tufted at the tip in the males, but thick and conical in the females. The larva has the back furnished on each side with a tuft of short hairs; the sides of the body are thickly clothed with decumbent hairs, and a larger one on the back of the second segment behind the head as well as on the penultimate segment. The cocoon is spindle-shaped and compact.

SPECIES 1.—ODONESTIS POTATORIA. PLATE X., FIG. 15, 16, 17.

SYNONYMES.—*Phal. (Bomb.) potatoria*, Linnæus; Albin, plate 17; Wilkes, plate 58; Harris, Aurelian, plate 42; Donovan, vol. 5, plate 148.
Odonestis potatoria, Germar; Stephens; Wood, Ind. Ent., t. 6, f. 52, 52; Duncan, Brit. Moths, pl. 18, fig. 1. 2.
Cosmotriche potatoria, Hübner, Verz. bek. Schm.

This fine although common insect varies from 2⅓ to 3 inches in the expansion of the fore wings, which in the male are of a rich reddish buff clouded with fulvous, with two white dots placed one above the other, the upper one being the smaller, in the middle of the wing towards the costa; beyond which runs a straight dark line from the middle of the hind margin to the tip of the wing, and is succeeded by a more indistinct dentate line; the hind wings and body are of the ground-colour of the fore wings. The female is altogether paler, being of a delicate fawn colour, but with similar markings to the male. The colours vary occasionally; being either lighter or darker in both sexes.

The caterpillar is dark brown, very much freckled with pale dots, a yellowish line on each side, with white tufts of hair along the sides above the feet. It is very abundant in June, feeding on grasses, the moth appearing in the following month. It is very abundant throughout the country.

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DESCRIPTION OF PLATE XI.

INSECTS.—Fig. 1. Lasiocampa Rubi, female (the Fox moth). 2. The Caterpillar. 3. The Caterpillar when young. 4. The Cocoon and Chrysalis.

„ Fig. 5. Lasiocampa Trifolii (the grass-egger). 6. The Female. 7. The Caterpillar.

„ Fig. 8. Lasiocampa Roboris, female (the great oak Egger moth). 9. The Male. 10. The more common variety of the Male with dark border. 11. A variety of the Female with a corresponding dark border. 12. The Caterpillar.

„ Fig. 13. Lasiocampa Quercus (of Hübner).

„ Fig. 14. Lasiocampa Dumeti.

The male of the fox moth is very similar to the female, but differs in being of a somewhat richer colour, smaller, and having the antennæ pectinated. The male of L. Trifolii, as exhibited in the plate, has a pale band on the hind wings, a peculiarity upon which a separate species has been founded; but as I have found none but males so distinguished, I am inclined to think it a mere sexual difference. The two varieties of L. Roboris have also been by some made two species. L. Quercus is from Hübner's figure, and L. Dumeti and the dark female are in the British Museum; L. Dumeti being a foreign specimen. The others are all from the beautiful specimens furnished by Mr. H. Doubleday. The young caterpillar of the fox moth, the cocoon and the caterpillar of L. Trifolii, are from Hübner; the other two are from nature. In the present plate a few leaves of plants are introduced merely for the purpose of exhibiting the caterpillars more conveniently. H. N. H.

LASIOCAMPA, SCHRANK. BOMBYX P. BOISDUVAL.

This group has the wings entire, and comparatively elongated and opaque, the hinder ones rounded; the abdomen of neither sex regularly tufted at the tip, but bifid in the males; the palpi minute, and not porrected like a beak; the antennæ deeply bipectinated in the males, straight and serrated in the females. The males fly with amazing rapidity by day. The larvæ are solitary in their habits, and clothed with long hairs (whence the generic name, derived from the Greek); when alarmed they curl themselves up in a ring, when the pale annulations of the body become distinct, as represented in our fig. 3, whence they have gained the name of the "devil's gold rings." The nomenclature of the species has been greatly confused, varieties having been often regarded as distinct species. Dr. Boisduval, in his new work, gives only L. Rubi, Quercus, and Trifolii as natives of central and northern Europe.

SPECIES 1.—LASIOCAMPA RUBI. PLATE XI., FIG. 1—4.

SYNONYMES.—*Phalæna (Bo.) Rubi*, Linnæus; Albin, pl. 81, fig. a—d; Wilkes, pl. 54; Donovan, 2, pl. 69.

Bombyx Trifolii, Panzer.

Lasiocampa Rubi, Schrank; Stephens; Wood, Ind Ent., t. 6, fig. 40.

Metanastra Rubi, Hübner, Verz. bek. Schm.

This species varies from 2⅛ to 2⅔ inches in the expansion of its fore wings, which, as well as the body and hind wings, are of a fox colour (whence the English name of the species), the fore wings having two scarcely oblique pale stripes, variable in their position, across the middle; and the fringe of the hind wings is whitish. The female is paler, but similarly marked.

The caterpillar when young, is blackish and velvety, with golden rings (fig. 3), but it afterwards becomes ferruginous above and black beneath, with black rings edged with fulvous and reddish hairs; it forms a long and nearly transparent cocoon, through which the chrysalis can be seen. It feeds on the bramble, and appears in the autumn; the perfect insect being produced at the beginning of the following summer. It is not an uncommon insect, but is difficult to rear.

SPECIES 2.—LASIOCAMPA TRIFOLII. PLATE XI., FIG. 5, 6 7.

SYNONYMES.—*Phalæna (Bomb) Trifolii*, Villars; Lewin, Linn. Trans., vol. 3, pl. 4, fig. 1—4; Wilkes, pl. 47, upper figure; but not of Schäffer, who figures Rubi under this name.

Lasiocampa Trifolii, Schrank; Stephens; Wood, Ind. Ent., pl. 6, fig. 41.

Pachygastria Trifolii, Hübner, Verz. bek. Schm.

This species varies from 2⅓ to 2½ inches in the expanse of the fore wings, which, as well as the other parts of the insect, are of a rusty grey colour, the fore wings having a whitish central spot, and a pale livid or ochre-coloured stripe beyond the middle of the wing, which is curved outwards toward the hinder margin. The hind wings are ordinarily destitute of the central fascia.

The caterpillar is described by Fabricius as solitary, pilose, dirty brown, with the incisions spotted with blue, and a red ring round the neck; it feeds upon trefoil, medick, and plantain, in the early summer months, enclosing itself in a compact oval cocoon; the imago appearing in July and August. This is a rare species, but is found in the New Forest in some plenty. Mr. Haworth states that the caterpillars secrete themselves by day under loose stones, but adds that the thick-kneed bustard preys upon them, ingeniously turning over the stones in order to come at them.

LASIOCAMPA MEDICAGINIS, Ochsenh. (Curtis, B. E., pl. 181; Wood, Ind. Ent., t. 6, f. 42; Wilkes, pl. 47, fig. infer.), is most probably only a variety of the preceding, differing in having a pale stripe towards the base of the fore wings, and an indistinct fascia across the hind ones. The larva, according to Esper's figure copied by Curtis, is, however, different, being of a dull fulvous colour, with black rings and white oblique lateral stripes; but Mr. Stephens states that Mr. Ingpen reared this variety from a larva, which differed in no respect from those of L. Trifolii, with which it was found in company, which is also the case with the perfect specimens which have occurred. Boisduval sinks it into a variety of Trifolii, as does also Stephens in his Catalogue of the British Lepidoptera of the British Museum, 1850, p. 46.

SPECIES 3.—LASIOCAMPA ROBORIS. PLATE XI., FIG. 8—12.

SYNONYMES.—*Ph. (B.) Roboris*, Schrank; Stephens; Wood, Ind. Ent., t. 6, f. 44, 44 (Las. R.)

Phalæna Quercus, Fabricius; Donovan, vol. 3, pl. 104, f. 1,2; Albin, pl. 18; Wilkes, pl. 56; Harris, Aurelian, pl. 29, fig. a—f; Duncan, pl. 17, f. 3. H. Doubleday.

Pachygastria Quercus, Hübner, Verz. bek. Schm.

This species varies from 2½ to 3⅓ inches in expanse. The males are of a dark rusty or chestnut brown, the fore wings having a central white spot, beyond which is a broad yellow fascia, gradually softened into dark chestnut to the tip of the wing, running across all the wings. The female is generally of a buff or pale ochre colour, with similar markings. Varieties however, occur, such as our fig. 9, in which the tips of the wings of the male do not gradually become darker coloured, and our fig. 11, in which the females are much darker coloured than ordinary. The caterpillar is dirty clay coloured, with white rings, and white oblique stripes above the feet. It feeds on the oak and various other trees, and forms a compact egg-like cocoon, whence the species has acquired the name of the great egger-moth. The moth appears at the end of July, the males flying with great rapidity during the day. It is very abundant in the neighbourhood of London and other parts of the country.

SPECIES 4.—LASIOCAMPA QUERCUS. PLATE XI., FIG. 13.

SYNONYMES.—*Phalæna (Bomb.) Quercus*, Linnæus; Schrank; Stephens; Wood, Ind. Ent., t. 6, f. 43.

This species, if it really be distinct, measures from 2½ to 3¼ inches in expanse. It differs from the preceding (which I should consider as a variety of it, as does also Stephens in his Catal. Lep. Brit. Mus., p. 46, 1850) in

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being darker coloured, with a distinct yellow patch at the base of the fore wings, the central white spot more triangular, the yellow fascia less dilated, and more curved inwardly. The caterpillar is ochre-coloured, ringed with black and with oblique white lateral stripes. It feeds on the oak and other trees, and the moth appears in August. It is found abundantly in the south-west parts of England, but is rare near London, where it is replaced by the preceding insect. Dr. Dahlbohm, the Swedish entomologist, has recently figured L. Quercus, which agrees with that given by Wood. Our figure 13, copied from Hübner, must therefore represent a variety analogous to the variety of Roboris, delineated in our figure 9. Another variety from Scotland has been described as distinct by Mr. Palmer, in the Zoologist, page 1656.

LASIOCAMPA SPARTII of Hübner, given by Stephens and Curtis as a variety of L. Roboris, is considered by Boisduval as distinct, and is an inhabitant of the *south* of Europe.

LASIOCAMPA? DUMETI of Schrank (Hübner, Bombyx, pl. 37, fig. 164; Wood, Ind. Ent., t. 53, fig. 33 and our fig. 14), has the wings brownish, with a pale central spot, and a pale clay-coloured fascia running across the wings; the hind margin is also pale clay-coloured. The caterpillar is slightly hairy, with black spots arranged in a double series. It undergoes its metamorphosis in the ground without making a cocoon, and the chrysalis has the tip of the body bimucronate. It is given by Stewart as a native species, but there is no other authority for its indigenous origin.

DESCRIPTION OF PLATE XII.

INSECTS.—Fig. 1. Dendrolimus Pini (the scarce Lappet Moth), male. 2. The Caterpillar. 3. The Cocoon.
„ Fig. 4. Gastropacha Quercifolia (the Lappet moth), female. 5. The Insect at rest. 6. The Caterpillar. 7. The Cocoon.
„ Fig. 8. Gastropacha Ilicifolia. 8.* The Caterpillar.
„ Fig. 9. Gastropocha Populifolia. 10. The Caterpillar.

Dendrolimus Pini is from the specimen in the British Museum, as well as G. Ilicifolia, which latter is however a foreign specimen, and it is very doubtful whether any well-authenticated British specimen exist; G. Populifolia is from Hübner's figure. The female of G. Quercifolia is drawn from a beautiful specimen given me by Mr. Doubleday; and the male closely resembles it, except in size, being smaller.

The caterpillars of D. Pini and G. Populi, and G. Ilicifolia, and the cocoons of D. Pini and G. Quercifolia, are from Hübner. The caterpillar of G. Quercifolia is from a finely-preserved specimen in the British Museum, purchased with others at the sale of Mr. Donovan. H. N. H.

DENDROLIMUS, GERMAR. EUTRICHA, STEPHENS.

This group is distinguished by having the fore wings entire, and the hind ones slightly dentated along the outer margin; the antennæ of the males are nearly straight and deeply bipectinated; the palpi distinct and rather short; the apex of the abdomen is not tufted; the fore wings bear a white stigma-like central spot, and are not acute at the apex. Most of these characters will separate it from Odonestis, as well as from Gastropacha, with which it has been recently united by Boisduval, evidently on account of the similarity of its transformations.

* 8 is repeated intentionally, to agree with the plate.

SPECIES 1.—DENDROLIMUS PINI. PLATE XII., FIG. 1—3.

SYNONYMES.—*Phal. (Bomb.) Pini*, Linnæus; Wilkes, pl. 61; Donovan, vol. 5, pl. 177, 178.
Odonestis Pini, Curtis, B. E., pl. 7.
Eutricha Pini, Stephens; Wood, Ind. Ent., tab. 6, fig. 51.
Lasiocampa Pini, Boisduval; Hübner, Verz. bek. Schm.

This fine and extremely rare species varies from 2½ to 3½ inches in expanse. The fore wings are dark grey at the base, with a white spot in a dark patch before the middle, followed by an obsolete ashy bar, then a lobed reddish bar beyond the middle, edged before and behind with a grey line spotted with blackish, the extremity of the wing being greyish-ashy coloured; the hind wings and body are reddish-grey. The female is much larger and paler coloured than the male, the fore wings reddish-grey with the white spot, and the hind wings unspotted.

The caterpillar is variegated with red, brown, grey, and white, with two blue fasciæ near the head, spotted at the sides with red; it is tufted with hairs, one thicker than the rest near the tail. It feeds on pine-trees, the imago appearing at the end of July.

Specimens of this moth were contained in several old English collections, but the only recorded instances of its capture in England, are a caterpillar taken in September, 1748, in Richmond Park, by Wilkes, and a male moth captured by Mr. Sparshall, in the Norwich Hospital, on the 22nd July, 1809, which is now in the British Museum.

GASTROPACHA (SPEC. TYP.), OCHSENHEIMER.

This genus is well distinguished by its robust form, very curved antennæ, denticulated wings, thick abdomen (whence the generic name, derived from the Greek), destitute of an anal tuft, elongated palpi advanced like a beak in front, and antennæ nearly alike in both sexes. The remarkable appearance which the insects exhibit when at rest, as represented in our figure 5, is caused by the dilated margins of the hind wings extending beyond the costa of the fore wings, which, joined to the colours of the insects, gives them the appearance of dead leaves of the oak and other trees.

SPECIES 1.—GASTROPACHA QUERCIFOLIA. PLATE XII., FIG. 4—7.

SYNONYMES.—*Phal. (Bo.) Quercifolia*, Linnæus; Albin, pl. 16; Wilkes, pl. 57; Harris, Aurelian, pl. 43, fig. a—c; Donovan, vol. 7, pl. 332.
Gastropacha Quercifolia, Ochsenheimer; Stephens; Curtis, Brit. Ent., pl. 24; Wood, Ind. Ent., tab. 6, f. 53; Duncan, Brit. Moths, pl. 18, fig. 3, 4.
Phyllodesma Quercifolia, Hübner, Verz. bek. Schm.

This fine insect measures from 2¼ to 3¼ inches in expanse. The general colour is dark rich chestnut, the extremity of the wings suffused with a pale lilac bloom; the fore wings with three oblique waved black stripes, and a black spot between the two nearest the body; the hind wings are unspotted, the outer edge redder than the rest; the palpi are black. Varieties occur in the greater or less distinctness of the stripes, which sometimes run across the hind wings. The caterpillar is very large, and remarkable for having the sides of its body furnished with fleshy appendages, whence the moth has received the name of the "Lappet;" it is dark grey or brownish, with two dark blue stripes near the head, and with fascicles of hairs, the one on the penultimate segment being the largest. The chrysalis is thickly powdered with a white bloom. It feeds on willows,

whitethorn, and pear, as well as on grasses; and although not a common insect, it is very abundant where it occurs, as in the Huntingdonshire fens, Epping, and near Hertford. The moth appears at the beginning of July.

SPECIES 2.—GASTROPACHA ILICIFOLIA.

SYNONYMES.—*Phalæna (Bo.) Ilicifolia*, Linnæus; Ochsenheimer; Stephens; Wood, Ind. Ent., pl. 53, fig. 35; and our plate 12, fig. 8 and 8.

This species is not above one-fourth of the size of the preceding, with the wings grey; the disc of the fore ones varied with three oblique reddish fasciæ; the hind margin marked with a row of white spots.

Ochsenheimer describes two distinct varieties of the caterpillars, which are found in June, July, and August on the sallow, as well as on Vaccinium Myrtillus. The moth appears in May.

Introduced by Turton as a native species, but no British specimen was preserved in any of our cabinets until the end of May, 1851, when a very fine individual was captured by the Rev. W. S. Atkinson on Cannock Chace, near Rugeley, Staffordshire.

GASTROPACHA POPULIFOLIA, Fabricius (Hübner, Bomb., pl. 43, f. 189; Stephens; Wood, pl. 53, fig. 36; and our pl. 12, fig. 9, 10), is another equally unauthenticated species, introduced by Martyn. It is as large as G. Quercifolia, but the fore wings are narrower, and the body more slender; the general colour is reddish-buff, the thorax with a dark line, and the wings marked with numerous dusky arches, forming several oblique fasciæ. The caterpillar feeds on various species of Populus and Salix; and the moth appears in June.

FAMILY VII.—ARCTIIDÆ, LEACH.

This family, with which I have united the Notodontidæ of Stephens, nearly corresponds with the third section of the Nocturna of Latreille, or the Pseudo-Bombyces, and comprises those species which have the wings deflexed in repose, the posterior pair not extending beyond the costa of the anterior; they are connected together by a spring and socket; the antennæ of the males are strongly bipectinated or serrated, the spiral tongue is either obsolete or of very small size, and the labial palpi are generally short and obtuse at the tip, with the last joint very small. The caterpillars vary very considerably, being in some species naked, but variously tubercled; in others thickly hairy; and in some furnished with long tufts of hairs. They feed entirely upon the external parts of plants, and enclose themselves in cocoons when about to undergo their transformations.

I find it impossible to draw a line between the genera which compose Mr. Stephens's two families, Notodontidæ and Arctiidæ. The structure of the mouth will not assist in the inquiry, because Hammatophora, Cerura, etc., amongst the Notodontidæ, have the maxillæ, and even the maxillary palpi (as discovered by Curtis), developed as strongly as in Spilosoma and Arctia; whilst there is as great a variation in the transformations of the genera of either group, as there is between the respective species of the two groups. The family, nevertheless, comprises several distinct types of form, which Boisduval has considered as the representatives of as many distinct tribes; namely:—1. NOTODONTIDES (including Hammatophora and Clostera, as well as the more typical groups). 2. COCLIOPODES (Apoda and Heterogenea). 3. PSYCHIDES. 4. ENDROMIDES (Aglaia and Endromis). 5. LIPARIDES (Liparis and Orgyia). 6. CHELONIDES (Arctia, etc.)

DESCRIPTION OF PLATE XIII.

INSECTS.—Fig. 1. Stauropus Fagi (the Lobster). 2. The Caterpillar.
„ Fig. 3. Hammatophora Bucephala (the buff-tip Moth). 4. The Caterpillar.
„ Fig. 5. Clostera Anastomosis. 5. The Caterpillar.
„ Fig. 6. Clostera Reclusa (the small chocolate tip). 7. The Caterpillar.
„ Fig. 8. Clostera Suffusa.
„ Fig. 9. Clostera Anachoreta (the scarce chocolate-tip). 9. The Caterpillar.
„ Fig. 10. Clostera Curtula (the chocolate tip). 10. The Caterpillar.
„ Fig. 11. Notodonta Dromedarius (the iron prominent). 12. The Caterpillar.
„ Fig. 13. Ditto variety. (Notodonta Perfusca) (the dark prominent).
„ Fig. 14. Notodonta Zic-zac (the pebble prominent). 15. The Caterpillar.
„ Fig. 16. Phæosia Dictæa (the Swallow prominent). 17. The Caterpillar.
„ Fig. 18. Phæosia Dictæoides (the swallow likeness). 19. The Caterpillar.

PLANTS.—Fig. 20. Corylus avellana (the common hazel). 21. Populus tremula (the aspen). 22. Fagus sylvatica (the common beech).

Figures 3, 6, 10, 14, 16, 18 are from specimens kindly furnished me by Mr. H. Doubleday. The others are from British specimens in the British Museum, with the exception of C. Anastomosis, which is from a foreign specimen, and C. Suffusa and N. Perfusca, which are from Mr. Stephens's figures.

The caterpillars of S. Fagi and N. Dromedarius are from Standish's original drawings in the British Museum; all the others are from Hübner. Although the forms of some of these larvæ are exceedingly singular, in the chrysalis form they present no striking peculiarity; and I have not therefore thought it worth while to give figures of any of them. H. N. H.

STAUROPUS*, GERMAR, STEPHENS. (HARPYIA, BOISDUVAL.)

This genus is at once distinguished by the male antennæ having about one-fourth of their length at the tip destitute of pectinations, the basal portion being bipectinated; the female has the entire antennæ simple. The maxillæ can scarcely be called conspicuous (as described by Boisduval), consisting only of two rudimental lobes. The fore wings are narrow, elongate-ovate, with several elevated tufts of scales. But it is in the larva state that the genus is most easily distinguished, the caterpillar being of a most singular form; whence it has obtained amongst collectors the name of the Lobster. Its singularity consists in the great length and slenderness of the second and third pair of feet, the angulated back, and the dilated, recurved extremity of the body, furnished with two long, slender, horny appendages, which take the place of the ordinary anal feet of the caterpillars.

SPECIES 1.—STAUROPUS FAGI. PLATE XIII., FIG. 1, 2.

SYNONYMES.—*Phal. (Bomb.) Fagi*, Linnæus, Donovan, vol. 12, pl. 398; Albin, pl. 58; Curtis, Brit. Ent., pl. 674 (Stauropus F.); Wood, Ind. Ent., tab. 5, f. 23.

Terasion Fagi, Hübner, Verz.
Harpyia Fagi, Boisduval, Gen. et Ind. Meth.

This rare species varies from 2⅓ to 3 inches in expanse; it is of a dull greyish-brown, with the fore wings varied towards the base and hind margin with reddish; the base is pale, succeeded by a broad dark bar, with

* Derived from the Greek σταυρος, vallus, and πους, pes; evidently in allusion to the singular feet of the larva.

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several paler patches occupying the middle of the wing, followed by a waved and toothed pale stripe. The apical portion of the wing is paler, with a row of small, black, submarginal dots, preceded on the costa by a luteous stripe; the hind wings are brown, with an angulated, pale stripe running from the outer margin halfway across the middle of the wings. The female is more uniformly coloured on the fore wings. The caterpillar is rusty grey or fawn colour. The cocoon is described as closely woven, and more resembles silver paper than any other material, being, however, perfectly pliant to the touch.

The moth is of rare occurrrnce; having been found chiefly in the southern parts of England, in various localities. The most northerly recorded locality is near Worcester. The moth appears in June and in the early part of July, and the caterpillar in the autumn. It feeds on various forest-trees—hazel, alder, sloe, etc.

HAMMATOPHORA*, Westw. PYGÆRA, Stephens. PHALERA, Hübner.

This genus has the wings denticulated along the outer margin, but the posterior edge is not toothed; the thorax is crested with two elevated tufts at the sides; the antennæ in the males are thick and obtusely dentated, and furnished with a double series of curved setæ, which extend to the tip; the fore wings are elongate-triangular; the abdomen is elongate, and terminated by an undivided tuft; the fore feet are extended forwards in repose. The caterpillars are soft and hairy, sixteen-footed, and ornamented with interrupted black stripes on a pale ground; the pupa state is passed beneath the surface of the ground.

SPECIES 1.—PHALERA BUCEPHALA. Plate XIII., Fig. 3, 4.

Synonymes.—*Phal.* (*Bomb.*) *bucephala*; Linnæus; Donovan, vol. 1, pl. 3; Albin, pl. 23, fig. 33, a—d; Wilkes, pl. 43; Harris, Aurelian, pl. 39, fig. a—c; Curtis, Brit. Ent., pl. 530; Wood, Ind. Ent., t. 5, fig. 9; Duncan, Brit. Moths, pl. 15, fig. 3 (Pygæra, b.)

This common but handsome species varies from rather more than 2 to nearly 3 inches in the expansion of its fore wings, which are of a silvery grey colour, but darker along the costa, with a slender transverse black line, preceded by a red one near the base of the wings, several dusky bars across the middle, and with a large oval, cream-coloured apical patch, enclosing several small buff spots; edged within by a curved red line, preceded by a black one, which lines again occur near the anal angle of the fore wings; the margin is varied with black, grey, and fulvous red. The hind wings are whitish, with a dusky mark near the anal margin. The thorax is buff, crested with dark brown at the sides and behind. The caterpillar is yellow, with black legs, and several rows of interrupted black stripes. It is found in the autumn on the oak, elm, and various other trees, living whilst young in society; the moth appearing in June. The chrysalis is subterranean, with two small points at the tail.

* The name Pygæra (derived from the Greek πυγη, nates, and αἴρω, porto) was given by Ochsenheimer, evidently in allusion to the elongated tufted tails of Anachoreta, etc., which are his typical species of this genus, Ochsenheimer correctly doubting the propriety of placing Bucephala even at the end of this group. There are, therefore, no grounds for retaining the name of Pygæra for the buff-tip moth, for which it is clearly inappropriate. I therefore proposed in the first edition of this work, in its stead, a name derived from the Greek ὄμμα, nodus, and φερω, porto, in allusion to the singularly nodose antennæ of the males. The change, although founded upon the strict rules of zoological nomenclature, was to be regretted, as it happened that both English and French authors were in accordance in adopting the name Pygæra for the buff-tip moth. Hübner had, however, previously proposed the name of Phalæra, and Meiger, that of Acrosema for the group.

CLOSTERA*, Hoffmansegg. PYGÆRA (pars typica), Ochsenheimer.

This genus agrees with Hammatophora in the general form of the wings (destitute of teeth on the hind margin); but they are shorter, and the outer margin is not denticulated: they are also marked with pale transverse streaks, and a large chocolate-coloured apical patch; the antennæ are also short and bipectinated in both sexes; the thorax is only crested behind. The fore feet are not stretched forwards in repose; the abdomen of the males is long, terminated by a bifid tuft. The caterpillars are thick, and slightly hairy, with the fourth and terminal segment generally tubercled. They reside in a web, wherewith they draw together several leaves; in which, also, the pupa state is passed.

SPECIES 1.—CLOSTERA RECLUSA. Plate XIII., Fig. 6, 7.

Synonymes.—*Bombyx reclusa*, Fabricius; Esper, vol. iii. pl. 5, fig. 6 and 7.
Clostera reclusa, Stephens; Curtis; Wood, Ind. Ent., tab. 5, fig. 10.
Phalæna anastomosis, Donovan, 4, pl. 124 (male), and pl. 129, f.
Ichthyura reclusa, Hübner, Verz. bek. Schm.

This species varies from 1 to 1¼ inch in the expanse of the fore wings, which are of an ashen colour, with four pale, transverse, slender bars, which unite together; a brownish spot on the costa close to the fourth stripe; beyond which is a large chocolate-coloured patch, which does not extend to the tip. The hind wings are dirty brown. The thorax black in front, with the sides ashy.

The caterpillar is brown, with a broad, pale, dorsal stripe, and a row of yellowish rings at the sides of the body. This is a rare species, but occurs in several of the woods in the London district. It has also been found near Cambridge, Dublin, and in the Isle of Arran.

The caterpillar feeds on the aspen, willow, and poplar, beneath the bark of which it is sometimes found, in the autumn; the moth appearing in May and July, or August.

Clostera Anastomosis, Linn. (Wood, Ind. Ent., t. 53, fig. 30, and our fig. 5 and 5), was recorded by Stewart as a native species; but no British specimen is known in any cabinet. It measures 1¾ inch in expanse, and has the wings grey and varied with brown and dark red, with three whitish subanastomosing bars, and a reddish thorax. The caterpillar bears considerable resemblance to that of Cl. Anachoreta.

SPECIES 2.—CLOSTERA SUFFUSA. Plate XIII., Fig. 8.

Synonymes.—*Clostera reclusa*, var. β, Stephens, Illustr. Haust., pl. 16, fig. 1.
Cl. suffusa, Steph. Illustr. H., 4, p. 385; Wood, Ind. Ent., pl. 52, f. 1656.

This species, which Mr. Stephens at first considered to be a variety of Cl. reclusa, is rather larger than that insect, having the hind wings "pale-glaucous ash, with two angulated, fuscous, transverse strigæ; the fore wings with the third striga united obliquely with the fourth on the interior margin." It was described from a specimen in the collection of the late N. A. Vigors, Esq., and is now in the possession of the Zoological Society of London. No locality is given of this specimen, unless it be the individual recorded to have been captured at Dublin by the Rev. J. Bulwer. [Mr. Stephens has now (1851) sank it into a variety of Cl. reclusa.]

* Derived from the Greek κλωστὴρ, fusus, evidently from the fusiform abdomen. Hübner's synonymous name Icthyura (fish-tailed) has a similar allusion, as well as Ochsenheimer's Pygæra, as stated above.

SPECIES 3.—CLOSTERA ANACHORETA. PLATE XIII., FIG. 9 and 9.

SYNONYMES.—*Bombyx anachoretus*, Fabricius, Haworth. | *Clostera anachoreta*, Stephens; Curtis, Brit. Ent., pl. 715; Wood Ind. Ent., tab. 5, fig. 11.
Bombyx curtula, Esper, 3, pl. 57, fig. 1—4; (nec Linn.)

This species measures 1¼ inch in the expansion of the fore wings, which are of a greyish colour, tinged with lilac, with four pale streaks, the first and second obliquely transverse, the third abbreviated in front and bent, and the fourth interrupted in the middle, the anterior portion running through the large, chocolate, apical patch, the extremity of which is tinged with lilac, and marked next the stripe with three orange dots; beneath the chocolate patch is a black dot, preceded by a row of smaller ones. The hind wings are brown.

The caterpillar is grey, having a lateral row of fulvous spots, two black stripes down the back with fulvous dots; the fourth and anal segment with a large chestnut tubercle. It feeds on willows and poplars, in June and October, and the moth appears in May and July. It is extremely rare in England, no other specimens being recorded except those in the British Museum, which were captured near Salisbury by the late Mr. Spratt.

SPECIES 4.—CLOSTERA CURTULA. PLATE XIII., FIG. 10 and 10.

SYNONYMES.—*Phal. (Bomb.) curtula*, Linnæus; Albin, pl. 88; Hübner, tab. 22, fig. 89. | *Clostera curtula*, Stephens, Curtis; Wood, Ind. Ent., pl. 5, fig. 12.
Bombyx anachoreta, Esper, 3, pl. 51, fig. 5.

This species measures from 1⅓ to 1½ inch in the expanse of its fore wings, which are of a reddish-grey colour, with four nearly straight, whitish streaks, and a large apical patch entirely of a testaceous brown, or shining, reddish-fawn colour, in which is an obscure row of five brown dots. The hind wings are ashy-grey coloured.

The caterpillar is pilose, ashy-coloured, with four rows of reddish spots. It is found in the autumn on willows and poplar-trees, the moth appearing at the end of April or in May; also (according to Boisduval) in July. It occurs, but by no means abundantly, in the neighbourhood of London, and other parts of the south of England, and has been found near Coleshill by the Rev. W. T. Bree.

The remainder of the species represented in this plate (13), and the majority of those upon the following plate, constitute (notwithstanding the singular diversity of the caterpillars) a natural group, which Ochsenheimer retained as a separate and single genus, under the name of Notodonta, a name derived from the Greek, having reference to the prominent lobe of scales upon the hind margin of the fore wings, and which, when the insect is at rest, is raised over the back; whence the English name of Prominent moths, given by collectors to these insects, which have been subdivided by Mr. Stephens into a number of genera, several of which have been sunk by Curtis and Boisduval.

NOTODONTA (PARS TYPICA, OCHSENHEIMER), STEPHENS.

As restricted by Mr. Stephens, this group comprises those species which have the fore wings moderately long and obtuse at the tips, with a single hind lobe, and the outer margin somewhat denticulated; the thorax not crested; the antennæ only pectinated in the males, being simple in the females. The caterpillars are smooth (without hairs), with the back tubercled, being furnished with two imperfect anal feet. They generally rest with the extremity of the body elevated, in the same manner as Stauropus and Cerura.

SPECIES 1.—NOTODONTA DROMEDARIUS. PLATE XIII., FIG. 11 and 12.

SYNONYMES.—*Phal. (Bomb.) Dromedarius*, Linnæus; Hübner, pl. 7, f. 28; De Geer, v. i. t. 4, fig. 13—17; Donovan, vol. x. pl. 350, fig. 1.

Notodonta Dromedarius, Ochsenheimer; Stephens; Curtis, Brit. Ent., pl. 739 (variety); Wood, Ind. Ent., t. 5, f. 24.

Bombyx Dromedarulus, Haworth, Samouelle (variety).

Phalæna Zebu, Donovan, 12, pl. 397, fig. 1.

VARIETY.—*Notodonta perfusca*, Stephens, Illustr. Haust., 2, pl. 14, fig. 2, and our plate xiii. fig. 13.

Bombyx perfuscus? Haworth.

B. camelina? Harris, Exposition, pl. 13, fig. 5.

This species measures from 1⅓ to nearly 2 inches in the expanse of the fore wings, which are of a reddish or purplish-brown, with the base, and two dentated, whitish, slender fasciæ; the second are very much curved, and between these fasciæ is a dark, ear-shaped mark on the disc, edged with buff; and beyond the second is a chestnut-coloured, irregular, submarginal fascia. The hind wings are brown, with an obscure whitish bar across the middle. The colours vary considerably in brightness and depth.

The caterpillar is green, with the under surface purplish: it becomes reddish when ready to change. It is found in September on oak, poplars, beech, hazel, etc. The moth appears in June and August. It is of scarce occurrence, but is met with in the woods near London, as well as in Worcestershire, Cheshire, and Suffolk.

Bombyx Dromedarulus, the small Iron prominent of Haworth, is considered as a small variety of this species, differing in having the thorax red, and the wings reddish, with two obsolete streaks, the outer one dentated.

Mr. Stephens, in his Illustrations, described a variety of this species as distinct, under the name of N. perfusca, and as varying from 1½ to 1⅝ inch in expanse, being similar to the last, but of a totally different hue, and, like its congeners, extremely variable in the intensity and brilliancy of its markings; anterior wings fuscous, mixed with chestnut, with darker clouds and an irregular yellowish patch at the base, a slightly undulated striga before, and a flexuous and deeply-indented one behind the middle, terminating at the costa and near the anal angle in a yellowish streak; between the strigæ is a fuscous streak, edged with yellowish, and the hinder margin has a slightly-waved row of reddish or chestnut spots; posterior wings fuscous, with a light, rather flexuous, oblique striga arising from the anal angle; abdomen fuscous; thorax dusky, sometimes rufescent in the middle.

This description was taken from specimens found near Dublin, all of which agreed in these particulars, and differed from every specimen of D. Dromedarius seen by Mr. Stephens, which were strongly rufescent. Mr. Curtis, however, regards them as a variety of that species, as does also Stephens in his List of the British Lepidoptera, recently published (1850). The perfuscus of Haworth was described from a specimen in Drury's collection, reared from the larva in England. The *dark prominent* (B. camelina) of Harris has been referred to this species, but is described by that author as having had the head, thorax, and abdomen of a dirty brown, with some waves of a lightish hue crossing them. "On the slip edge are *two* small prominences or angles. The inferior wings are almost white, and totally plain; and the abdominal corners are as if scorched." It was taken in May.

SPECIES 2.—NOTODONTA TRITOPHUS.

SYNONYMES.—*Bombyx Tritophus*, Wiener Verz.; Fabricius; Douglas in Entomologist, p. 385, but not of Donovan nor Hübner, fig. 29.

Bombyx torva, Hübner, fig. 27.

Head and thorax brown; abdomen ashy; fore wings clouded with brown, with several obsolete waved darker streaks; a white central lunule, with a lunate ferruginous pupil; hind wings white, with a brown streak on the anal angle; caterpillar solitary, naked, green, with three dorsal prominences, and the tail obtuse; head brown.

Reared by Mr. Douglas on the 10th of August, from the caterpillar found in an excursion along the Essex coast beyond Colchester.

SPECIES 3.—NOTODONTA ZIC-ZAC. Plate XIII., Fig. 14, 15.

Synonymes.—*Phal. (Bomb.) Zic-zac*, Linnæus; Donovan, 4, pl. 119; Albin, pl. 14, fig. 20, e—k; Wilkes, pl. 28.

Notodonta Zic-zac, Ochsenheimer, Stephens; Wood, Ind. Ent., pl. 5, f. 26.

This species varies from 1⅔ to nearly 2 inches in the expansion of the fore wings, which are of a pale, fulvous buff colour, lighter coloured towards the costa in the middle, the base and apex being waved with brown, the apical portion of the wing being occupied by a large, oval, variegated, ocellated spot, tinged with purplish, and edged at the base with a brown lunule; the outer and hind margin being edged with a slender, dark line. The hind wings are pale ashy, with a similar dark edging, and a dark, discoidal arch; the anal angle brown.

The caterpillar is ashy-coloured, with the under side purplish, and a pale lateral line; it has only two dorsal tubercles. It feeds on the poplar and willow in June and September, the moth appearing in May or the beginning of June and August. It appears to be distributed over the greatest part of England, but is nowhere of common occurrence.

PHÆOSIA, Hübner. (LEIOCAMPA*, Stephens.)

Mr. Stephens characterises this group as having the fore wings elongate, obtusely denticulated, and acute at the tip, with one lobe on the hind margin; the thorax not crested; the antennæ are bipectinated in both sexes to the tip; the pectinations shorter in the female; and the palpi very minute: the larvæ are smooth on the back, the penultimate segment alone having a dorsal tubercle; and the anal segment furnished with a pair of perfect pro-legs. The cocoon is composed of pieces of wood, united by silk. Both species are double-brooded in the course of the year. Curtis and Boisduval regard this group only as a section of Notodonta.

SPECIES 1.—PHÆOSIA DICTÆA. Plate XIII., Fig. 16, 17.

Synonymes.—*Phal. (Bomb.) dictæa*, Linnæus, S. N. 2, 825, No. 60; Wien. Verz., Hübner, Ochsenheimer (Notod. d.), Fabricius, Esper.

Phal. (Bomb.) tremula, Linnæus, Faun. Suec. Syst. Nat. 2, 286, No. 58; Haworth; Curtis (Notod. tremula).

Leiocampa dictæa, Stephens; Wood, Ind. Ent., t. 5, f. 27.

Phalæna trepida, Donovan, 7, plate 239, fig. 1; Leach, Samouelle.

Phœosia dictæa, Hübner, Verz. bek. Schm.

This species varies from 2 to 2½ inches in the expansion of the fore wings, which are of a greyish-white colour towards the costa, except at the tips, broadly clouded with brown, with two or three black lines near the apex; the posterior margin of the wing is broadly black, through which runs an interrupted, whitish line, and there are several greyish lines at the anal angle; the apical margin is marked by a blackish line, preceded by a white one; the hind wings are white, with the anal angle brown, through which runs a white line.

The caterpillar is shining, dark, reddish-brown, often with a violet tinge, the penultimate segment conically elevated. It feeds on all kinds of poplars, willows, and on the common birch; and is found in June and October, and the imago occurs in June and August. It is not a common species; but is met with in the woods near London, near Dover, York, and in Norfolk and other localities.

* Derived from Λειος, lævis, and καμπη, eruca; the caterpillars being smooth.

SPECIES 2.—PHÆOSIA DICTÆOIDES. PLATE XIII., FIG. 18, 19.

SYNONYMES.—*Bombyx dictæoides*, Esper, Brahm; Hübner, Bomb. tab. 6, f. 23,24; Haworth.
Leiocampa dictæoides, Stephens; Wood, Ind. Ent., pl. 5, fig. 28.
Phæosia dictæoides Hübner, Verz. bek. Schm.
Bombyx Gnoma, Fabricius.

This species is generally rather smaller than the preceding, which it greatly resembles, but is distinguished by being darker-coloured, with the hind margin more broadly brown, on which is a white stripe bordering a black patch, and there is a triangular white spot near the anal angle. The hind wings are brownish or dirty white, with the anal angle marked by a dusky patch.

The caterpillar is pale green and glossy, with a slender, yellow, lateral line; the under side pale fleshy-coloured.

It is rather rare, occurring in the same situations as the preceding species in July.

DESCRIPTION OF PLATE XIV.

INSECTS.—Fig. 1. Lophopteryx Camelina (the coxcomb Prominent). 2. The Caterpillar.
„ Fig. 3. Lophopteryx Cucullina (the maple Prominent). 4. The Caterpillar.
„ Fig. 5. Lophopteryx Carmelita.
„ Fig. 6. Pterostoma Palpina (the pale Prominent).
„ Fig. 7. Petasia Cassinia (the Sprawler). 8. The Caterpillar.
„ Fig. 9. Peridea trepida (the great Prominent). 10. The Caterpillar.
„ Fig. 11. Drymonia dodonæa (the marbled brown).
„ Fig. 13. Drymonia chaonia (the lunar marbled brown). 14. The Caterpillar.
„ Fig. 15. Gluphisia crenata.
„ Fig. 16. Drymonia querna. 17. The Caterpillar.
„ Fig. 18. Ptilophora plumigera. 19. The Caterpillar.

PLANTS.—Fig. 20. Acer Campestre (the common Maple).
„ Fig. 21. Quercus Sessiliflora (a variety of the common oak).
„ Fig. 22. Ligustrum vulgare (the common Privet).

Figs. 1, 7, 9, 11, 13 are from specimens kindly furnished by Mr. H. Doubleday; all the rest are from specimens in the British Museum. The caterpillars 8 and 4 are from the original drawings of Standish; Hübner represents 8 of the same form, but white, delicately tinted with glaucous green, with conspicuous red stripes. The others are from Hübner. H. N. H.

LOPHOPTERYX*, STEPHENS.

This group is separated by Mr. Stephens, on account of the thorax of the species of which it consists being crested; wings with the outer margin dentate; the hind margin of the triangular fore wings with a simple lobe; the antennæ of the males alone bipectinated; the abdomen in the males terminated by a trifid scaly tuft. The caterpillars are furnished with one or two conical protuberances near the extremity of the body.

SPECIES 1.—LOPHOPTERYX CAMELINA. PLATE XIV., FIG. 1, 2.

SYNONYMES.—*Phal. (Bomb.) camelina*, Linnæus; Albin, pl. 69, fig. a, c, d, e; Donovan, pl. 183.
Lophopteryx camelina, Stephens; Wood, Ind. Ent., pl. 5, f. 29.
Odontosia camelina, Hübner, Verz. bek. Schm.
Phal. (Bomb.) capuzina, Linnæus; Esper, 3, pl. 70, fig. 1—5.

This species varies from 1½ to 1⅝ inch in the expanse of the fore wings, which are of a reddish hue, inclining to brown, with a dark bar, angulated at each side, terminating at the brown posterior lobe, and succeeded by a paler bar, and gradually dilated towards the costa; there are also other denticulated lines, and darker stripes varying in intensity in different individuals. The hind wings are ochre-brown, with a dark patch at the anal angle glossed with blue.

* Derived from the Greek, and alluding to the crest on the hind margin of the fore wings.

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The caterpillar is green or reddish, with the back pale, a yellow line spotted with red at the sides, and two red points on the back at the extremity of the body. It feeds on oak, birch, poplar, willow, etc., and appears in May and at the end of September; the moth (according to Haworth) being produced at the beginning of May and August. Boisduval, however, gives June alone as its time of appearance. It is one of our commonest species of Prominents. A figure of the larva in its more ordinary position is given in my Introduction, vol. ii. p. 385, fig. 2.

SPECIES 2.—LOPHOPTERYX CARMELITA. PLATE XIV., FIG. 5.

SYNONYMES.—*Bombyx carmelita*, Esper; Ochsenheimer; Stephens, Ill. Haust., pl. 14, fig. 3; Wood, Ind. Ent., pl. 6, fig. 51. | *Bombyx capuzina*, Hübner, (nec Linnæus.)

This species measures rather more than 1½ inch in the expanse of the fore wings, which have the fore margins reddish-brown, with a small white spot before the middle, and a larger triangular one beyond the middle; the posterior margin of the wing is pale greyish-white, with a slight purplish tinge, and an oblique row of dusky spots at some distance preceding the outer margin. The disc is also irrorated with light and dark freckles, especially along the veins, and the hind marginal tooth is brown. The hind wings are reddish-brown, with a slight pale fascia crossing them beyond the middle, terminating in two dark abbreviated streaks near the anal angle.

The caterpillar is green, with a yellow dorsal line and a stripe of the same colour, but spotted with red on each side above the feet. It feeds on the birch.

Extremely rare. Found in Darenth and Ongar-park Woods in the spring, March (Stephens), May (Boisduval). In the cabinets of the British Museum and Zoological Society.

This and the preceding species form a distinct section in the genus, the larva having two conical lobes on the terminal segment.

SPECIES 3.—LOPHOPTERYX CUCULLINA. PLATE XIV., FIG. 3, 4.

SYNONYMES.—*Bombyx Cucullina*, Wien. Verz.; Hübner; Ochsenheimer; Boisduval (Notodonta Cuc.) | *Bomb. cuculla*, Esper; Borkhausen; Haworth; Donovan, vol. x. pl. 338, fig. 1; Stephens (Lophopteryx Cuc.); Wood, Ind. Ent., t. 5, fig. 30.

This species measures from 1½ to 1⅝ inch in the expanse of the fore wings, which are of a pale ochre colour, spotted and striped with brownish-red, especially beyond the middle and along the hind margin, and with a broad sub-apical whitish fascia, interrupted in the middle; the costa has several short dark streaks beyond the middle; the hind wings grey-brown, with a dark brown red patch at the anal angle.

The caterpillar is pale grey, with a dark patch on the back of the anterior segments, beyond which the segments are dorsally elevated, and with a more distinct conical protuberance near the extremity of the body. It feeds on maple and some of the species of thorns, and is found in August. The moth appears at the beginning of the following summer. It is very rare in England, but sometimes occurs in the woods of Kent.

PTEROSTOMA*, GERMAR. (PTILODONTIS, STEPHENS.)

This genus is at once distinguished by the great length of the palpi (which are nearly half as long as the antennæ), which, together with the crest on the thorax, and the *two* lobes on the hind margin of the fore

* Derived from the Greek, in allusion to the large palpi appearing like a pair of small wings attached to the mouth.

wings, and the elongated and upturned tail, give the insect, when at rest, a singular appearance (as figured in my Introduction to the Modern Classification of Insects, vol. ii. p. 385, fig. 4). The wings have the outer margin denticulated. The females have the antennæ bipectinated. The larva is smooth, depressed, without conical tubercles, and attenuated at each end.

SPECIES 1.—PTEROSTOMA PALPINA. Plate XIV., Fig. 6.

Synonymes.—*Phal. (Bomb.) palpina*, Linnæus; Haworth. | *Pterostoma palpina*, Germar; Stephens (App. vol. iv. p. 385); Curtis, Cat.
Ptilodontis palpina, Hübner; Stephens; Boisduval; Wood, Ind. Ent., t. 6, fig. 32.

This species measures from 1½ to 2⅛ inches in the expanse of the fore wings, which are of a very pale buff colour, marked with numerous blackish stripes and spots, especially along the veins of the wings; a rather dark brownish cloud runs obliquely across the middle, between which and the hind margin is a double row of punctures. The hind wings are brown, with the base pale.

The caterpillar is green, with several pale lines, freckled with black along the back, and a yellowish lateral one freckled with red. It is found at the end of May and September upon poplars, willows, etc., and the moth appears at the beginning of those months. It is by no means a rare species, and is occasionally found in the woods round London.

PETASIA*, Stephens. ASTEROSCOPUS, Boisduval.

This genus differs in wanting the lobe on the hind margin of the fore wings (which have only a tuft of scales in its place), and the crest on the thorax. The fore wings are elongate-triangular, opaque, with dark longitudinal streaks, and not dentated on the margin; the antennæ of the males bipectinated, and dentato-crenulated in the females. The caterpillars, which are naked, fleshy, longitudinally striped, and with the extremity of the body conical above, have the habit of stretching themselves out and assuming the attitude of the sphingideous larvæ.

SPECIES 1.—PETASIA CASSINIA. Plate XIV., Fig. 7, 8.

Synonymes. — *Phal. (Bomb.) Cassinia*, Wien. Verz.; Fabricius; Haworth; Donovan, vol. xii. pl. 379, fig. 2; Stephens; Wood, Ind. Ent., pl. 6, fig. 36 (Petasia C.) | *Asteroscopus Cassinia*, Boisduval, Ind. Meth.
Brachionicha Cassinia, Hübner, Verz. bek. Schm.
Bombyx Sphinx, Esper, pl. 49, fig. 1—3.

This moth has much the habit of one of the Noctuidæ; indeed Ochsenheimer unites it with the genus Xylina belonging to that family. It measures from 1½ to nearly 2 inches in the expanse of the fore wings, which are of an ashy-brown colour, with numerous black short lines, one of which at the base, and another along the hind margin, are more distinct; besides which there is a faint interrupted pale stripe at the hinder margin, which is sometimes quite obliterated. The hind wings grey, with a dark central patch, and the margin spotted with black.

The caterpillar is green, with yellow longitudinal lines, two of which unite at the anal prominence; it feeds on the oak, beech, and other forest trees in May, and the moth appears in September and October. The species is widely dispersed through the country, but is most ordinarily found in the woods of the south of England, although rare, especially in the winged state.

* Derived from the Greek, and alluding to the outstretched attitude of the Sprawler, as the caterpillar is named by collectors.

PERIDEA*, Stephens. NOTODONTA, p., Bdv., Curtis, Ochsenh.

This genus has a prominent lobe on the hind margin of the fore wings, which are entire on the outer margin, and squamose; but not so opaque as in the next genus. The antennæ are serrated and bipectinated in the males. It bears considerable resemblance in form and in the markings on the *anterior* margin of the hind wings to Stauropus, but the caterpillar more nearly resembles that of Petasia (with which it agrees in its sprawling habit and stripes) and Chaonia, which, like it, has no anal tubercle; in which respect it also differs from Endromis, with which, however, it agrees in its oblique lateral markings.

SPECIES 1.—PERIDEA TREPIDA. Plate XIV., Fig. 9, 10.

Synonymes.—*Bombyx trepida*, Fabricius; Ochsenheimer; Esper; Curtis; Boisduval (but not of Donovan, Leach, etc., which is Leiocampa dictæa).

Bombyx tremula, Wien. Verz.; Hübner (but not Linnæus, which is Leiocampa dictæa).

Phalæna Tryophus, Donovan; Haworth; but not of Fabricius and Wien. Verz. (which is the Torva of Hübner, but not of Ochsenheimer).

Bombyx Chaonius, Schrank; but not of Hübner and Wien. Verz.

Bombyx serrata, Thunberg; Stephens (Peridea serr.); Wood, Ind. Ent., tab. 6, fig. 37.

This species, the largest of all our Prominents, varies from 2 to 2½ inches in the expansion of the fore wings, which are clouded with grey and ashy-brown, with a central red-brown lunule edged with greyish; there are two transverse irregular dark stripes before the middle of the wing, a third much angulated and nearly obsolete streak, followed by two dark lines near the tip, and a row of oblong spots towards the outer margin, which is marked with dark lunules. The hind wings are yellowish-white, more fulvous towards the body, with the outer margin greyish.

The caterpillar is pale green, with several yellow dorsal lines, and a series of short oblique lateral ones. It feeds on the oak in August and September, and the moth appears in May and June. It is a rare species, occurring in the woods round London, as well as in Norfolk.

DRYMONIA†, Hübner. (CHAONIA, Stephens.)

This group, which Boisduval unites with Notodonta, has the fore wings opaque, and but very slightly lobed on the hind margin; the outer margin is entire; the thorax is scarcely crested; the antennæ in the males bipectinated, and nearly simple in the females; the palpi are short; the abdomen of moderate length. The caterpillars are naked, entire, and without a conical prominence at the extremity of the body.

SPECIES 1.—DRYMONIA DODONÆA. Plate XIV., Fig. 11.

Synonymes.—*Bombyx dodonæa*, Wien. Verz.; Hübner; Haworth; Wood, Ind. Ent., pl. 6, fig. 35; Curtis, Brit. Ent., pl. 755 (Drymonia d.)

Bombyx trimacula, Esper; Donovan, iv, pl. 352, fig. 2.

Bombyx tripartita, Borkhausen.

Bombyx ilicis, Fabricius.

This variable species measures from 1⅓ to 1⅔ inch in the expansion of the fore wings, which are of a pale

* Derived from the Greek, in allusion to the tremulous movement of the caterpillars when alarmed.

† Derived from the Greek, in allusion to the habitat of the insects in oak groves.

brown or buff-grey, marbled with brown and black, the base varied with two dark waved stripes, followed by a pale one, then a broader brown bar followed by a very pale one, rounded behind with a waved line of brown, which is dilated at the fore and hind margins into a patch; the cilia is alternately brown and white; the hind wings pale, with a darker bar across the middle. The ground colour of the fore wings is, however, liable to vary considerably, being occasionally much more suffused with brown than in our figure. One of these varieties was described by Mr. Haworth as distinct, and supposed by him to be the Bombyx querna of Fabricius.

The caterpillar is pale green, with a grey dorsal line, and a lateral yellow line spotted with red, and a blue head. It feeds on the oak in September; the moth appears in May and June, and is rather rare in the woods round London. It is also found in other parts of the country.

BOMBYX QUERNA (Fabricius; Wiener Verzeichniss; Wood, tab. 53, fig. 38; and our figures 16 and 17) is a distinct species, not hitherto detected in this country, although a variety of the preceding was considered by Mr. Haworth as identical with it; it has the fore wings grey, with three waved black stripes margined with white, the basal one being very minute; before the last of these stripes is a whitish lunulated mark. The hind wings are entirely whitish. The caterpillar is gibbous behind, green, with four yellow longitudinal lines and black spiracles. It is found on the oak in August, and the moth appears in May and June.

SPECIES 2.—DRYMONIA CHAONIA. PLATE XIV., FIG. 13, 14.

SYNONYMES.—*Bombyx Chaonia*, Wien. Verz.; Hübner; Ochsenheimer (Notod. ch.); Godart; Boisduval; Curtis; Hübner, Verz. bek. Schm. (Drymonia ch.) | *Bombyx Roboris*, Fabricius; Haworth; Donovan, vol. ix. pl. 299; Stephens (Chaonia Rob.); Wood, Ind. Ent., pl. 6, fig. 34.

This species measures from 1⅛ to 1⅜ inch in the expanse of the fore wings, which are of a pale ashy-grey colour, with two undulated transverse whitish bars edged with dusky, and a middle black lunule on a broad central whitish fascia; near the outer margin is a pale and almost obsolete curved streak; the hind wings are grey-brown, with indistinct pale transverse bars, and a dusky lunule in the centre.

The caterpillar is pale green, with dorsal and lateral yellow lines; it feeds on the oak, birch, and hazel, and is found in September, and the moth appears in May and June. It is a rather scarce species, but is occasionally found in the woods near London, as well as in Suffolk, Devonshire, and Worcestershire.

GLUPHISIA*, BOISDUVAL. (GEN. ET IND. METH.)

M. Boisduval, in his recent work, separates the type of this genus from the rest of his Notodontæ (including Drymonia), with the following characters: antennæ of the male broadly pectinated; palpi of the ordinary form; wings short and rather broad; the anterior without the lobe on the hind margin; the caterpillars smooth, depressed, glabrous. Chrysalis inclosed in a slight cocoon amongst leaves.

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* From the Greek, in allusion to the crenated markings of the typical species.

SPECIES 1.—GLUPHISIA CRENATA. Plate XIV., Fig. 15.

Synonymes.—*Bombyx crenata*, Esper; Borkhausen; Ochsenheimer (Notod. cr.); Godart; Boisduval (Gluphisia cr.)
Bombyx creniosa, Hübner, Bomb., t. 4, f. 12.

This species has the fore wings broad, and without a lobe on the hind margin, ashy-grey, with two brownish-black crenated streaks, and two bars of brown, one near the base and another in the middle, on which is a yellowish stigma; the cilia is alternately dark and light; the hind wing pale, with two dusky fasciæ terminating near the anal angle in a slightly darker patch.

The caterpillar is found in August on the black poplar, and resembles that of Pterostoma palpina; it is pea-green, with dorsal and lateral pale stripes. Discovered by Mr. H. Doubleday, in Ongar-park Wood, Essex, in June, 1839, and again found there in June, 1841.

PTILOPHORA*, Stephens. (NOTODONTA, pars Boisduval.)

This genus is at once distinguished by the singularly feathered antennæ of the males, by the fore wings, which are sub-pubescent and pilose, the posterior margin angulated with hair near the base; the space occupied by the branches of the median vein very broad, the margin itself between these branches being very slightly emarginated; the palpi small, and not porrected; the abdomen rather short; the caterpillars smooth, and without dorsal or subapical tubercles. The antennæ of the females are slightly serrated.

SPECIES 1.—PTILOPHORA PLUMIGERA. Plate XIV., Fig. 18, 19.

Synonymes.—*Bombyx plumigera*, Wien. Verz.; Fabricius; Hübner; Esper; Ochsenheimer; Godart; Boisduval (Notod. pl.); Curtis, pl. 328 (Ptiloph. plumig.)

Phal. (Bomb.) variegata, Villars; Stephens, Ill., 2, pl. 14, fig. 1 (Ptiloph. plum.); Wood, Ind. Ent., pl. 6, f. 33.

This curious species measures from 1⅓ to 1⅔ inch in expanse. The body and fore wings are of a reddish ochre colour, glossed with pale purple, a slight obsolete blotch near the base, an arcuated stripe beyond the middle, and the outer margin being paler; the antennæ brown; the hind wings have a rosy grey tinge, with a very indistinct fascia across the middle. In the female the colour of the fore wings is still more uniform.

The caterpillar is of a greenish colour, with a leaden dorsal stripe, and several pale lateral ones. It feeds on the maple, sallow, and birch in May, and the moth appears in October and November. It is a rare species, but is occasionally found, especially in the larva state, in Darenth and Birch Woods.

* From the Greek, in allusion to the soft feathery antennæ borne by the males. The specific name plumigera indicates the same peculiarity, but as it is improper to change specific names without absolute necessity requires it, it would have been more correct to have selected a generic name of a different signification. It is equally incorrect, in order to remedy the evil, to adopt Villars's more recent specific name variegata for the typical species.

DESCRIPTION OF PLATE XV.

INSECTS.—Fig. 1. Cerura integra of Stephens (variety? of C. bicuspis).
„ Fig. 2. Cerura bicuspis. 11. The Caterpillar.
„ Fig. 3. Cerura arcuata of Stephens (variety of C. bifida).
Fig. 4. Cerura furcula (the Kitten-moth.) 5. The Caterpillar. 6. Another Caterpillar of the same.
„ Fig. 7. Cerura latifascia of Curtis (variety of C. bifida,) (the broad-barred Kitten-moth).
„ Fig. 8. Cerura bifida. 9. The Caterpillar.
„ Fig. 10. Cerura fuscinula, from Hübner (not of Stephens).
„ Fig. 12. Cerura vinula (the Puss-moth). 13. The Caterpillar.
„ Fig. 14. Cerura erminea (the Ermine Puss-moth). 15. The Caterpillar.
PLANTS.—Fig. 16. Salix Russelliana (the Bedford Willow).
„ Fig. 17. Betula alba (the common Birch).

In the small Puss-moths I have shown what are considered the distinct species of continental entomologists, as figured by Hübner; viz. C. bicuspis, C. bifida, C. furcula, and C. fuscinula. Of the first three one only appears to me to be, beyond doubt, British, viz., C. furcula, the specimen I have drawn agreeing perfectly with specimens in the British Museum and other collections. C. fuscinula, the grey one, is said to have been once taken and in the possession of Mr. Desvignes, of the Entomological Society; but the British specimens said to be C. bicuspis and C. bifida, which I have seen, appear to me to be merely variations of C. furcula, which I am farther induced to consider the only British species, as it is the only one that has been found in the larva state, Standish's drawing of which I have figured, and which, though drawn with a somewhat different feeling, according well with Hübner's figure.

I have not figured the chrysalis of any of the above species, as they do not present any unusual peculiarities of form or colour, notwithstanding the singular conformation of the caterpillar. For the same reason I did not think it worth while to figure the chrysalids of Stauropus Fagi and the Notodontæ in plate 13.

C. bicuspis, C. bifida, C. furcula, and C. fuscinula are from Hübner; C. arcuata and C. integra are from the specimens in the cabinet of Mr. Stephens; and C. latifascia is from Curtis's figure. C. vinula is from a specimen in the British Museum, and C. erminea from a foreign specimen in Mr. Stephens's cabinet. The larva of C. vinula is from a drawing made from nature, and all the others are from Hübner, with the exception of the one of furcula, after Standish's drawing. H. N. H.*

CERURA, SCHRANK, LEACH, ETC.

(*Harpyia*, Ochsenheimer; *Dicranura*, Latreille; *Pania*, Dalman; *Furcula*, Lamarck.)

This very conspicuous genus has the antennæ in both sexes bipectinated, the hind margin of the fore wings not lobed, the palpi very small, the thorax not crested, the fore wings pale and subdiaphanous, the body very robust and pilose. The caterpillars are thick, smooth, fleshy, varied in their colours, with the extremity of the body attenuated, and terminated by two long filaments (whence the generic name derived from the Greek) instead of the ordinary anal pro-legs, and which enclose two slender, very long, fleshy threads, which the insect has the power of protruding or exserting at will.

The species are subject to considerable variation in markings, and in the first edition of this work I adopted the nine species described by Stephens and Curtis. This number is now (1851) reduced by H. Doubleday and Stephens (List Lep. Brit. Mus.) to four. There is still, however, some disagreement between these authors as to which of the species some of the smaller reputed species ought to be referred; and Dr.

* In the former edition of this work a woodcut was here given, in order to show the specific distinction of the several supposed species founded on the greater or less degree of furcation of the first vein of the hind wings, a character now proved to possess no specific value.—I. O. W.

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Herrick Schäffer informs me, that the names of Hübner have not even now been properly applied in England, so that the nomenclature of the species cannot yet be considered as settled.

SPECIES 1.—CERURA BICUSPIS. PLATE XV., FIG. 1, 2, 11.

SYNONYMES.—*Bombyx bicuspis*, Hübner; Ochsenheimer, but not of Curtis and Stephens.
Cerura integra, (?) Stephens, Illustr., and our plate 15, fig. 1.

This species varies from $1\frac{1}{6}$ to $1\frac{1}{2}$ inch in the expanse of its fore wings, which are snow-white; at the base is a single black dot, followed by five placed transversely, which are succeeded by a broad dark bar, margined with black and orange towards the base of the wings, with a slight emargination in the middle; the outward edge of the bar is less strongly defined, and very much sinuated in the middle, then follow several slender transverse markings (one more distinct than the rest) and several rows of waved pale grey streaks, the hind ones terminating in a large, dark, costal patch edged with black and orange; along the margin is a row of black dots. The hind wings are white, with a dusky discoidal spot, and black marginal punctures; the thorax is white in front, blue-black behind, with transverse orange spots.

The caterpillar is red-brown, with several white spots at the sides above the pro-legs, the under side green. It feeds on willow and birch. A specimen of the true C. bicuspis of Hübner is stated by Mr. H. Doubleday (Zoologist, p. 1863) to have been taken off an alder tree near Preston.

The variety of C. furcula, described by Mr. Stephens under the name of Cerura integra (Ill., pl. 15, fig. 3; Wood, Ind. Ent., pl. 5, fig. 15, and our plate 15, fig. 1), is given by Boisduval as a variety of C. bicuspis. It measures $1\frac{7}{12}$ inch in expanse, having the dark fascia across the fore wings broad, entire (and not sinuated), and cinereous, margined on both sides with black and orange; across the white central space runs a single, arcuated, obscure streak, and a similar one from the hinder part of the oblique, subapical, costal, cinereous patch. The hind wings have an obsolete fascia. The thorax is ashy, with three dark, slender, transverse fasciæ, the middle one being interrupted in the middle. This variety is very rare. Mr. Stephens believes his specimen to have been taken at Coombe Wood.

SPECIES 2.—CERURA FURCULA. PLATE XV., FIG. 4, 5, 6.

SYNONYMES.—*Phal. (Bomb.) furcula*, Linnæus; Fabricius; Hübner; Wilkes, pl. 29, fig. 2; Donovan, vol. 8, pl. 272; Stephens (Cerura f.); Wood, Ind. Ent., pl. 5, fig. 16.

Cerura bicuspis, Stephens, Illustr., but not of Borkhausen and Hübner. Variety.

This species measures from $1\frac{1}{6}$ to $1\frac{1}{2}$ inch in the expanse of its fore wings, which are of a grey colour, spotted at the base as in C. bicuspis; then follows an ashy-coloured, sinuated bar, ill defined on its outer margin, succeeded by a pale ashy patch, in which are several dusky spots and undulated streaks, and a discoidal lunule; towards the apex of the costa is an abbreviated dusky patch, terminating in a more distinct blackish wavy streak; the apex of the wing has a row of black dots; thorax grey in front, varied with black and orange behind.

The caterpillar is green, with a red patch behind the head, and an elongated one down the back (beyond the conical protuberance), margined at the sides with white; the anal filaments are also red. It feeds on willows and poplars during the autumn, and the moth appears in June and July.

It is by no means a scarce species, and is widely distributed throughout England.

The variety described by Mr. Stephens under the name of Cerura bicuspis, Ill. vol. ii. pl. 13, fig. 3 (but not of Borkhausen and Hübner), has the fore wings snow-white at the base, with one basal and five transverse, subbasal, black dots, and a submarginal row of black dots, and with a broad ashy bar thickly sprinkled with orange, beyond which are several waved dusky streaks, and with an oblique, abbreviated, subapical bar. Taken at Darenth Wood and near Dublin.

SPECIES 3.—CERURA BIFIDA. PLATE XV., FIG. 3, 7, 8, 9, 10.

SYNONYMES.—*Bombyx bifida*, Hübner; Stephens, Illustr., pl. 15, fig. 2; Wood, Ind. Ent., pl. 5, fig. 20.
Bombyx furcula, Wien. Verz.; Esper.
Cerura arcuata, Stephens, and our plate 15, fig. 3. Variety.
Cerura latifascia, Curtis; Stephens, and our plate 15, fig. 7. Variety (?)
Cerura fuscinula, Stephens; Wood, and our plate 15, fig. 10, but not of Hübner. Variety.

This species is about $1\frac{3}{4}$ inch in the expanse of the fore wings, which have a broad ashy bar speckled with orange and margined with black, the outer margin being more indistinct and irregular; the middle of the wing is marked with various dots, streaks, and wavy lines, the hind one proceeding from the extremity of the ashy, subapical, costal patch. The thorax is grey, striped with black and orange. The hind wings have a broad, brownish, submarginal fascia.

The caterpillar is green, marked on the back of the neck with a red-brown or violet-coloured patch, edged with white, and there is a similar coloured larger patch on the back, behind the conical protuberance. It feeds on various kinds of poplar, from June to the end of September.

The species is rare, but occasionally occurs near London.

The variety of C. bifida, formerly described by Stephens under the name Cerura arcuata, has the external margin of the narrow dark fascia in the anterior wings entire, and edged with black as well as the internal margin. It measures $1\frac{5}{12}$ inch in the expanse of the fore wings, which are of a grey colour; beyond the fascia (which has the hind margin rather angulated in the middle), the fore wings are of uniform colour, with a discoidal spot and two undulated strigæ of arched lines, the second of which is strongly marked and black, and terminates in a cinereous subapical patch on the costa; the thorax is ashy in front. A single specimen, taken at Coombe Wood, is in Mr. Stephens's cabinet.

The insect described and figured by Curtis, under the name of C. latifascia (Brit. Ent., pl. 193; Stephens, Illustr.; Wood, Ind. Ent., pl. 5, fig. 18, and our pl. 15, fig. 7), is considered as a variety of C. furcula by Boisduval and H. Doubleday, and as a variety of C. bifida by Stephens. It measures rather more than $1\frac{1}{2}$ inch in the expanse of the fore wings, and is distinguished by the great breadth of the broad ashy fascia, varied with orange and margined with black, extending from the costa to the anal angle; its external margin

sinuated. Then follow two indented streaks, inclosing a space in the middle of the wings marked with several black streaks. The hind wings have a pale brownish subapical band, and another more slender across the middle of the wings. The abdomen is banded with black.

Mr. Curtis reared his specimen from a caterpillar found in September on a narrow-leaved sallow, near Linton, North Devon, and the moth appeared in the following May; and Mr. Stephens has a specimen found near London.

The English specimens, which have been attributed to C. fuscinula by Stephens (Ill., pl. 15, fig. 1; Wood, Ind. Ent., pl. 5, fig. 19; and our plate 15, fig. 10), are generally rather less than 1¾ inch in the expanse of the fore wings, which have a narrow, ashy bar, speckled with orange, margined with black at the base, and likewise on the outer edge (which is considerably sinuated) towards the costa; the disc and extremity are but slightly varied with dusky spots and dentated streaks, and the costal subapical spot is small and indistinct. The hind wings have not a broad, brownish, subapical fascia. The thorax is grey in front, and varied with black and orange behind.

Mr. Stephens describes the caterpillar as of a fine emerald green, with the head brown, the back blue, and the retractile filaments red. It feeds on the birch and oak, and is occasionally found near London in July.

SPECIES 4.—CERURA VINULA. Plate XV., Fig. 12, 13.

Synonymes.—*Phalæna (Bombyx) vinula*, Linnæus; Fabricius; Wilkes, pl. 29, fig. 1; Harris, Aurelian, pl. 38, fig. a—e; Albin, pl. xi.; Donovan, vol. 3, pl. 85; Leach; Curtis; Stephens (Cerura v.) Wood, Ind. Ent., pl. 5, fig. 21; Duncan, Brit. Moths, pl. 15, fig. 1, 2.

Bombyx minax, Hübner. Variety.

This beautiful and at the same time very common species varies from 2½ to nearly 3½ inches in the expanse of its wings, which are of a milky white colour, but more ashy in the female; with a transverse row of black spots near the base, succeeded by a rather more cinereous-coloured bar, edged on both sides with black spots. Then follow in the discoidal cell three curved blackish stripes, which run in arches to the hind margin of the wing. Beyond the discoidal cell are two rows of blackish, very strongly dentate, waves; the spaces between the veins along the outer margin of the wing being marked with longitudinal, dark, wedge-like streaks. The hind wings are white, but more ashy in the female, and the margin with dusky spots. The thorax is ashy, spotted with black, and the abdomen milky white, with dusky marks. There are several varieties, chiefly differing in the deep or paler ground colour of the body and wings, and the intensity of the markings.

The caterpillar is green, with a reddish head, the back dull lilac, separated from the green colour by an angulated white stripe. It, however, differs considerably in its colours at different periods of its larva state; when full fed it encloses itself in a cocoon formed of chips of wood, agglutinated together so firmly that it is almost impossible to cut it with a knife. It feeds on willow, poplars, etc. in August, and the moth appears in the beginning of the following summer.

SPECIES 5.—CERURA ERMINEA. Plate XV., Fig. 14, 15.

Synonymes.—*Bombyx ermtnea*, Hübner; Ochsenheimer; Curtis; Stephens; Wood, Ind. Ent., pl. 5, fig. 22.

This species is very closely allied to the preceding, but is smaller, being 2¼ to 3 inches in expanse; the back of the thorax is white, spotted with black; the abdomen, with the four middle segments, black in the middle

and along the sides, leaving a white dorsal line; the extremity white, with two black double lines at the middle; the wings milk-white, with a smaller fascia formed by the two parallel lines (making a V in the middle); near the base a blackish middle stripe, followed by waving stripes and marginal punctures; the under wings in the female white.

The caterpillar feeds on various species of Populus, and very much resembles that of the preceding species; the head has two black spots, and the anal filaments are not spotted with black. Mr. Stephens (Illustr. Haust., vol. ii., p. 20) states that this fine species had been taken at Birch Wood. He has, however, rejected it from the indigenous list in his catalogue of the Lepidoptera of the British Museum, 1850, p. 269, the supposed British specimens being varieties of C. vinula.

DESCRIPTION OF PLATE XVI.

INSECTS.—Fig. 1. Endromis versicolor, male (the Kentish glory-moth). 2. The Female. 3. The Caterpillar.
„ Fig. 4. Disphragis Cæruleocephala, male (the figure-of-8 moth). 4. The Caterpillar.
„ Fig. 5. Apoda Testudo (the small oak egger-moth), male. 6. The Female. 7. The Caterpillar. 29. The Chrysalis.
„ Fig. 8. Heterogenea Asellus. 9. The Caterpillar. 30. The Chrysalis.
„ Fig. 10. Fumea Nitidella (the shining chimney-sweep). 11. The Caterpillar. The case is figured to the left of fig. 5.
„ Fig. 12. Fumea Pulla (the small chimney-sweep). The case is figured near the top of the right wings of fig. 5.
„ Fig. 13. Fumea Muscella (the transparent chimney-sweep).
„ Fig. 14. Fumea Bombycella.
„ Fig. 15. Fumea Pectinella (the light chimney-sweep).
„ Fig. 16. Psyche Fusca (the brown muslin moth). 28. The Female. 26. The Caterpillar, one-third larger than nature without its case. 27. The Chrysalis of the female.
„ Fig. 18. Nudaria Hemerobia.
„ Fig. 19. Nudaria Mundana (the muslin moth). 20*. The Caterpillar.
„ Fig. 20. Nudaria Senex (the round-winged muslin moth).

PLANTS.—Fig. 21. Alnus glutinosa (the common alder). 22. The common oak. 23. Salix arenaria (the downy mountain willow). 24. Briza media (common quaking-grass). 25. Cetraria glauca (a common lichen).

Endromis versicolor, male and female, Apoda Testudo, male and female, and the three species of Nudaria, are from specimens in the Museum; F. Nitidella, F. Pulla, and P. Fusca are from continental specimens, furnished to the Museum by Dr. Becker; H. Asellus, from the cabinet of Mr. Stephens; and D. Cæruleocephala, from a specimen sent to me by Mr. H. Doubleday. The caterpillar of E. versicolor is from an original drawing by Standish; that of D. Cæruleocephala, from Donovan. All the others are from Hübner, with the exception of the whole of the outlines relating to P. Fusca, which are from drawings furnished by Mr. Westwood. H. N. H.

ENDROMIS*, OCHSENHEIMER. DORVILLIA, LEACH.

This fine genus is distinguished by its large, subdiaphanous, variegated wings, of which the great median vein emits four branches, by which it may at once be separated from all the adjacent genera, as well as from Saturnia and Aglia (with which last it is united by Boisduval into a separate tribe under the name of Endromides). The antennæ are bipectinated in both sexes. There is no lobe on the hind margin of the fore wings. The parts of the mouth are extremely minute, and hidden by hairs.

* This name was used by Martial for a rough, hairy dress, and alludes to the abdomen of the perfect moth.

The caterpillar is sphingiform, being attenuated in front, naked, and fleshy, with a conical protuberance at the extremity of the body. The sides of its body are obliquely streaked, but the streaks run towards the head; whereas in the Sphingidæ they run in the opposite direction. The chrysalis is enclosed in a cocoon formed of leaves on the ground.

SPECIES 1.—ENDROMIS VERSICOLOR. PLATE XVI., FIG. 1—3.

SYNONYMES.— *Phal. (Bomb.) versicolor*, Linnæus; Wilkes, pl. 89; Donovan, vol. 5, pl. 158; Neale in Ent. Trans., vol. 1, pl. 9; Curtis, Brit. Ent., pl. 434; Duncan, Brit. Moths, pl. 16, fig. 3 (Endromis v.), Wood, Ind. Ent., pl. 6, fig. 38.

This beautiful insect varies from 2⅓ to 3½ inches in the expanse of the fore wings, which are of an orange-brown colour, or fawn-buff, having a rather bent white stripe across near the base, edged behind with black; then a ⋖-like black mark at the extremity of the discoidal cell, followed by a very much bent, white stripe, edged before with black, and followed by several whitish patches, of which three are more conspicuous near the tip of the wings. The hind wings have a dark, angulated mark in the middle, and a pale bar beyond the middle, edged in front with black and behind with brown, which latter colour is angulated. The female is less richly coloured than the male.

The caterpillar is green, with a yellow lateral line on the anterior segments, and paler oblique ones at the side of the others. It feeds on birch, beech, lime, hazel, etc., in June and July, and the moth appears in April, flying with great rapidity in woods. It is found in the woods of Kent, whence its English name, and other parts of the south of England. It has also been captured in Suffolk and Shropshire.

DISPHRAGIS*, HÜBNER. DILOBA, BOISDUVAL. EPISEMA, STEPHENS, NEC BDV.

This genus differs by having the two terminal branches of the median vein, and the single longitudinal one which arises from the vein which closes the discoidal cell, originating close together. so as almost to radiate from a point. The antennæ are long, bipectinated in the males, and simple in the females; the fore wings are destitute of a lobe on the hind margin; the thorax is crested, the palpi are elongated, and the tongue is short. The caterpillar is fleshy, marked with numerous small, black, setigerous tubercles. The chrysalis is enclosed in a slight cocoon of silk mixed with leaves, fastened on the stem of the trees on which the larvæ feed. I have adopted Hübner's generic name to avoid the confusion which the employment of the name Episema† produces, having been intended by Ochsenheimer for a genus of Noctuidæ, for a group of which it is still retained by Boisduval.

* Named from the Greek, in allusion to the double mark on the wing.

† Both Ochsenheimer's and Hübner's names appeared in 1816. On account, therefore, of the more accurate views of Hübner, it is more correct to adopt his name.

SPECIES 1.—DISPHRAGIS CÆRULEOCEPHALA. PLATE XVI., FIG. 4 and 4.

SYNONYMES.—*Phal. (Bomb.) cæruleocephala*, Linnæus; Albin, pl. 13, fig. 17, a—e; Wilkes, pl. 12; Harris, Aurelian, pl. 30, fig. a—d; Donovan, vol. 3, pl. 100; Stephens (Episema cær.); Wood, Ind. Ent. pl. 5, fig. 13.

This species varies from 1¼ to 1½ inch in the expanse of the wings, which are of a greyish-brown, with the base and extremity reddish; the middle of the wing being occupied by a rather bluer patch, separated before and behind by a black, very irregular, waved line, and enclosing two large, white, kidney-shaped spots united together, each constricted in the middle, and having a greyish interior, so as to give the appearance of the figure 8: the margin has a slender dark line. The hind wings are very pale buff, with a black streak near the anal angle.

The caterpillar is lead-coloured, with pale, luteous, longitudinal lines, and black dots. It feeds in May on the sloe and whitethorn; and the moth appears in August, being an abundant species.

The remainder of the insects in Plate XVI. are very anomalous in their structure, and of which the natural relations are very difficult to determine. In my "Modern Classification of Insects" (Generic Synopsis, p. 91), I arranged them at the head of the sub-family Arctiides (or the family Arctiidæ of Stephens), with the observation that they were nevertheless by no means to be considered as typical of such sub-family (as such a situation would indicate them to be), but that they were there placed, in order to maintain the passage from the slender-bodied tiger-moths to the Lithosiidæ unbroken; whereas in Stephens's arrangement they interrupt this chain, whilst in Curtis's Guide they are thrown out of the family after the Lithosiidæ. The difficulty is produced by attempting on paper to trace a linear series of relations—overlooking the numerous relations (extending in divers directions) which the views of various recent naturalists have so satisfactorily shown to exist, but which each has so dogmatically insisted upon controlling by his own "natural system." More than one of these systems has been applied to the order Lepidoptera, and with as little success as our absolute ignorance of so many of its contents might have led us to anticipate.

APODA*, HAWORTH. LIMACODES, LATREILLE (PARS). HETEROGENEA, P. KNOCH.

This singular genus, together with the next, which Mr. Stephens has separated from it, differs from all the other genera of moths in the structure of the larvæ, which resemble woodlice, and are destitute of feet.

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* Derived from the Greek, and alluding to the want of feet in the caterpillar state. Latreille's barbarous name, Limacodes (compounded of the *Latin* word limax, a snail, and the *Greek* termination indicating resemblance), has, notwithstanding its much later date, been adopted both by English and French authors. I have great pleasure, therefore, in restoring to my old instructor's generic name Apoda its right of priority over that of Latreille, although it would, perhaps, be still more correct to give Testudo as the type of Knoch's genus Heterogenea, and a new generic name (if really necessary) to Asellus.

Although there are only two European species, the number of North American ones is very considerable *. The present genus differs from the next in the form of its wings, which are subtrigonate, with the outer margin rounded, the porrected palpi turned upwards, and the more robust body and female antennæ; these organs in the male are simple.

SPECIES 1.—LIMACODES TESTUDO. PLATE XVI., FIG. 5, 6, 7, and 29.

SYNONYMES.—*Hepialus Testudo*, Wien. Verz.; Fabricius; Albin, pl. 68, fig. e—g; Wilkes, pl. 88; Stephens (Limacodes T.); Wood, Ind. Ent., pl. 9, fig. 90, 90.
Tortrix (and *Chelonias*) *Testudinana*, Hübner.
Phalæna funalis, Donovan, v. iii. pl. 76.
Hepialus Bufo, Fabricius, ♂
Bombyx Limax, Borkhausen.

This interesting insect varies from ¾ to 1⅓ inch in the expanse of the fore wings, which are of a dark orange or reddish colour, with two oblique, slender, dark streaks, one of which extends from the middle of the costa nearly to the base of the inner margin, and the other from beyond the middle of the costa towards the anal angle, the space enclosed between them being often darker, and varied with fulvous spots, especially in the males, whilst in the females the wings are but little varied in colour; the males, moreover, have the hind wings dusky.

The caterpillar is onisciform, naked, and green, with two whitish dorsal stripes. It feeds on the oak in September, and the moth appears in June; but is comparatively rare, sometimes, however, occurring in small quantities in the Kentish woods.

HETEROGENEA †, KNOCH.

Mr. Stephens separates this group from the preceding, in consequence of the "trigonate form of the fore wings, which are somewhat truncated posteriorly; the thorax and abdomen are rather slender, and the antennæ in the female are more slender than in that sex of Limacodes, and the palpi are very minute."

SPECIES 1.—HETEROGENEA ASELLUS. PLATE XVI., FIG. 8, 9, and 30.

SYNONYMES.—*Hepialus asellus*, Wien. Verz.; Fabricius; Stephens (Heterog. A.), Ill. Haust., 2, pl. 17, fig. 2; Wood, Ind. Ent., pl. 7, fig. 89.
Tortrix Asellanana, Hübner; ditto, Verz. bek. Sch. (Chelonias Asell.)
Heterogenea cruciata, Knoch, Beitrage.

This species varies from ¼ to ¾ of an inch in the expanse of the fore wings, which are of a brownish clay colour, without any spots, the fringe dusky, the hind wings dirty brown. The caterpillar is described by Fabricius as being of a red colour, with a dorsal yellow line spotted with black, and the sides green, and as feeding on the poplar. It appears in June, and has hitherto been found only in the New Forest, where it is very rare.

FUMEA, HAWORTH. PYSCHE, P. SCHRANK.

The insects composing this and the next genus are still more anomalous than the Limacodes, the males being winged, whilst the females are wingless; they, however, possess legs and antennæ, whereas the females of other species, which are nevertheless retained as congeneric by Boisduval, are vermiform. These, therefore, differ still more from the little Chimney-sweeps (as the species of the present genus are called by collectors) than Pysche fusca, which, like the Fumeæ, has a wingless female furnished with antennæ and feet. Fumea differs from Pysche in the very broad and hairy fore wings (occasioned by the singular dilatation of the costal region, which drives the

* Several of these are copied in plates 21 and 22 of Mr. Duncan's volume of Foreign Moths, just published; but the insect represented at figure 2 of plate 22, as the imago of fig. 1 (which is evidently a Limacodes) is one of the Anthroceridæ, and is closely allied to Syntomis. I possess specimens of it captured in Brazil by Mr. Swainson. Bombyx vulnerans of Lewin seems to be the Australian type of the same group, which, without sufficient characters, Mr. Duncan has termed Doratifera.

† So named from the heterogeneous character of the caterpillar.

veins far backwards), as well as in the arrangement of the veins. The antennæ of the males are very strongly pectinated. The mouth is obsolete. The species are termed Sack-trägers by the Germans, in consequence of the larvæ residing in cases formed of bits of twigs, grass, etc., fastened together with silk, which they carry about with them. When full fed, they fasten the end, previously occupied by the fore part of the body of the caterpillar, to the leaves or branches of the trees on which they reside; and they have the further instinct, previous to undergoing their transformations, to turn themselves in their case, sothat the moth is able to force the head of its chrysalis partly out of the opposite end, so as to enable it to make its escape. From various observations, it moreover appears that the females have the power of producing fertile eggs without a previous impregnation, as is also the case with the Aphidæ.

The species of the present genus are rare, and have been much confused in their synonymes. [In the first edition of this work I adopted the nomenclature given by Mr. Curtis, who had the opportunity of examining Mr. Haworth's typical specimens previously to their dispersal, but, from subsequent researches, it appears probable that F. pulla, plumella, pectinella, radiella, and bombycella ought to be reduced to one species. See Stephens' Cat. Brit. Lep., p. 56; and Newman in Zoologist, 1850.]

SPECIES 1.—FUMEA PULLA. PLATE XVI., FIG. 12.

SYNONYMES.—*Bombyx pulla*, Esper; Ochsenheimer; Boisduval; Stephens (? ?)
Fumea muscea, Haworth.
Fumea Bombycella, Stephens (?)
Tinea plumella, Hübner (? ?)
Fumea radiella, Var. Stephens' Cat. Brit. Lep., p. 56.

This is the smallest species in the genus, not measuring more than five lines in expanse; it has the wings rounded, black-brown, unspotted, with the entire margin hairy; the antennæ are but slightly pectinated. This species is very rare.

The larva case, figured between figures 1 and 4, is very long and slender, and of a pale greyish-buff colour; the empty chrysalis of the male is represented as partly protruding from the extremity, the male moth having made its escape.

FUMEA BOMBYCELLA, Hübner, Ochsenheimer, and our plate 16, fig. 14, was given by Stephens as identical with the Fumea muscea of Haworth, but it is not a British species. It is larger than any of the preceding, with the wings rounded, and of a livid colour, freckled with brown spots.

SPECIES 2.—FUMEA PLUMELLA.

SYNONYMES.—*Psyche plumella*, Curtis (Hübner, t. 1, f. 7 ?.)
Fumea pectinea, Haworth.
Fumea pectinella, Stephens; Fabricius.
Fumea radiella, Var. Stephens, Cat. Brit. Lep., p. 56.

This very rare species is rather larger than the preceding, the wings are rounded, ashy brown, and somewhat transparent; they are without spots, but have the entire margin darker. The antennæ of the males, according to Curtis, are twenty-jointed, sixteen having rays, which appear to be shorter than in P. radiella; the wings are rather browner, and the superior scarcely so broad as in that species. It is to be observed, that Ochsenheimer and Boisduval give Hübner's T. plumella as identical with pulla, the plumella of those authors and of the Wiener Verzeichniss being a distinct but closely allied species.

SPECIES 3.—FUMEA PECTINELLA. PLATE XVI., FIG. 15.

SYNONYMES.—*Bombyx pectinella*, Fabricius; Hübner; Ochsenheimer; Curtis. *Fumea plumea*, Haworth (?)
Fumea pulla (?), Stephens.
Fumea radiella, Var. Stephens' Cat. Brit. Lep., p. 56.

This species resembles P. plumella, but is rather larger; all the wings are of an ashy colour, and hyaline,

with the margin brown; the antennæ are clear brown, and the body clothed wiih black hairs; the cilia of the wings is yellowish-grey. This species is very rare in this country.

SPECIES 4.—FUMEA RADIELLA. PLATE XVI., FIG. 13.

SYNONYMES.—*Psyche radiella*, Curtis, Brit. Ent., pl. 332 ♂. *Fumea plumistrea*, Haworth. *Bombyx muscella* (?), Fabr.; Hübner; Stephens (Fumea M.)

The male of this species measures about half an inch in expanse, and is black, with a glossy purple tinge; the fore wings with the base and margins darker, the veins but slightly indicated, and the fringe long and blackish; the antennæ eighteen-jointed, fourteen only being deeply pectinated, the stem being whitish.

This species is found in grassy places, amongst furze, on heaths and forests, in the south of England, in the month of June.

SPECIES 5.—FUMEA NITIDELLA. PLATE XVI., FIG. 10.

SYNONYMES.—*Psyche nitidella*, Hübner; Ochsenheimer; Curtis; Stephens. *Fumea nitida*, Haworth.

This species measures scarcely half an inch in expanse. Its wings are somewhat more elongated than in the other species; they are brown and shining, with the veins darker, and the margins of an ashy-white colour, The antennæ are greyish-brown and long, with short pectinations; the hind wings are rounded, clearer coloured than the upper wings.

The caterpillar encloses itself in a case formed of bits of grass arranged longitudinally, as represented in our figure, near the tip of the left wings of the male of Limacodes testudo (fig. 5). The moth is very rare, but has been found several times near Darenth Wood in July.

SPECIES 6.—FUMEA RETICELLA *.

PYSCHÉ, STEPHENS. STERRHOPTRYX, HÜBNER.

The typical species of this genus differs from the other Sack-trägers by having short antennæ, with short curved pectinations in the male, and very short and slender ones in the females. The fore wings are elongate, triangular, with the veins arranged in a curious manner, the third branch of the median vein being forked close to its origin. They are very transparent, and but slightly hairy. The female is small, but very robust; destitute of wings, with the legs short; the extremity of the body clothed with a woollen mass, with the ovipositor exserted.

SPECIES 1.—PSYCHE FUSCA, PLATE XVI., FIG. 16, 17, 26, 27, 28.

SYNONYMES.—*Nudaria fusca*, Haworth; Stephens (Pysche f.)
Tinea hirsutella, Hübner, Tin., tab. 1, f. 5.
Psyche calvella, Ochsenheimer; Germar; Boisduval.
Sterrhoptryx calvella, Hübner, Verz. bek. Schm.

The male of this curious species measures about three quarters of an inch in the expanse of its fore wings, which are of a very pale, uniform, grey-brown colour, without any spots or markings, and transparent; the antennæ of the males dusky brown, the abdomen pale ashy coloured, with an ochreous tinge. The female has the head and thorax shining brown, and the sides of the abdomen grey.

The caterpillar is fleshy white, with the head and three anterior segments of the body spotted with dark brown, the spots varying in size, the legs increase in length, thus resembling the larvæ of Oiketicus of Guilding, figured in the Linnæan Transactions. The case is composed of bits of leaves and sticks fastened together without the

* *F. reticella*, Newman, in Zoologist, vii. App. xciv. (1850), a new and very distinct species taken on the banks of the Medway, Kent, with the wings beautifully mottled with net-like markings.

least regularity. The caterpillar feeds on the leaves of oak, willow, whitethorn, and hazel, in June and July, and the moth appears in the latter month. I have an extended series of observations on the natural history of this insect in manuscript, illustrated with numerous figures, having, in company with Mr. Ingpen, found the larvæ in Hornsey Wood, Middlesex, in 1827. It has also been found in other adjacent localities, but Mr. Ingpen informs me that he has more recently searched for the larvæ in vain, although we found them in the utmost profusion.

PACHYTHELIA, Westwood.

The discovery of the transformations of the insect described by Mr. Curtis under the name of Penthophora nigricans (vide *post*, p. 94), and of another closely-allied species, has proved that they have no relation to the Arctiidæ, but are nearly allied to Psyche, and consequently ought to be removed to this situation.

NUDARIA*, Haworth.

This is another curious genus, distinguished by its subhyaline rounded wings, which are present in both sexes, slender setaceous antennæ, slender recurved palpi, and long spiral tongue; the postcostal vein is peculiar, on account of its emitting three branches of equal length close to the tip of the fore wings. The caterpillars are clothed with very long hairs. They do not form portable cases; and the chrysalis is slender and silken, with the hairs of the caterpillar interwoven. As suggested by Curtis and Boisduval, the genus seems to be nearly related to the Lithosiidæ.

SPECIES 1.—NUDARIA MUNDANA. Plate XVI., Fig. 19, 20.

Synonymes.—*Phal. Attacus mundana*, Linnæus; Haworth (Nudaria m.); Stephens; Curtis, B. E., pl. 400; Wood, Ind. Ent., pl. 7, fig. 86.

Bombyx munda, Fabricius.

Bombyx nuda, Hübner, Bomb., pl. 1[illegible] fig. 63, 64.

This species measures from 9 to 11 lines in the expanse of the fore wings, which are of a very pale, whitish clay-colour, and iridescent, with a short dark stripe near the base, two slender arched, brown fasciæ across the wings (one before and the other beyond the middle), and with a dusky central dot and an indistinct dark wave parallel to the outer margin. The hind wings are without spots. The caterpillar (fig. 20*) is dark green, with a luteous stripe down the back. It feeds on lichens. The moth appears in July and August. It occurs in various parts of the country, and is by no means rare.

SPECIES 2.—NUDARIA HEMEROBIA. Plate XVI., Fig. 18.

Synonymes.—*Bombyx hemerobia*, Hübner, pl. 17, fig. 65. Stephens; Curtis; Wood, Ind. Ent., pl. 7, fig. 87 (Nudaria h.)

This species (now regarded as a variety of the preceding) differs from it in being of a smaller size, with the wings colourless and iridescent, without any spots or markings; the veins being slightly luteous, and the fringe yellowish. Specimens agreeing with this description have been reared by different collectors, as well as taken at large; but the species is rare.

SPECIES 3.—NUDARIA SENEX. Plate XVI., Fig. 20.

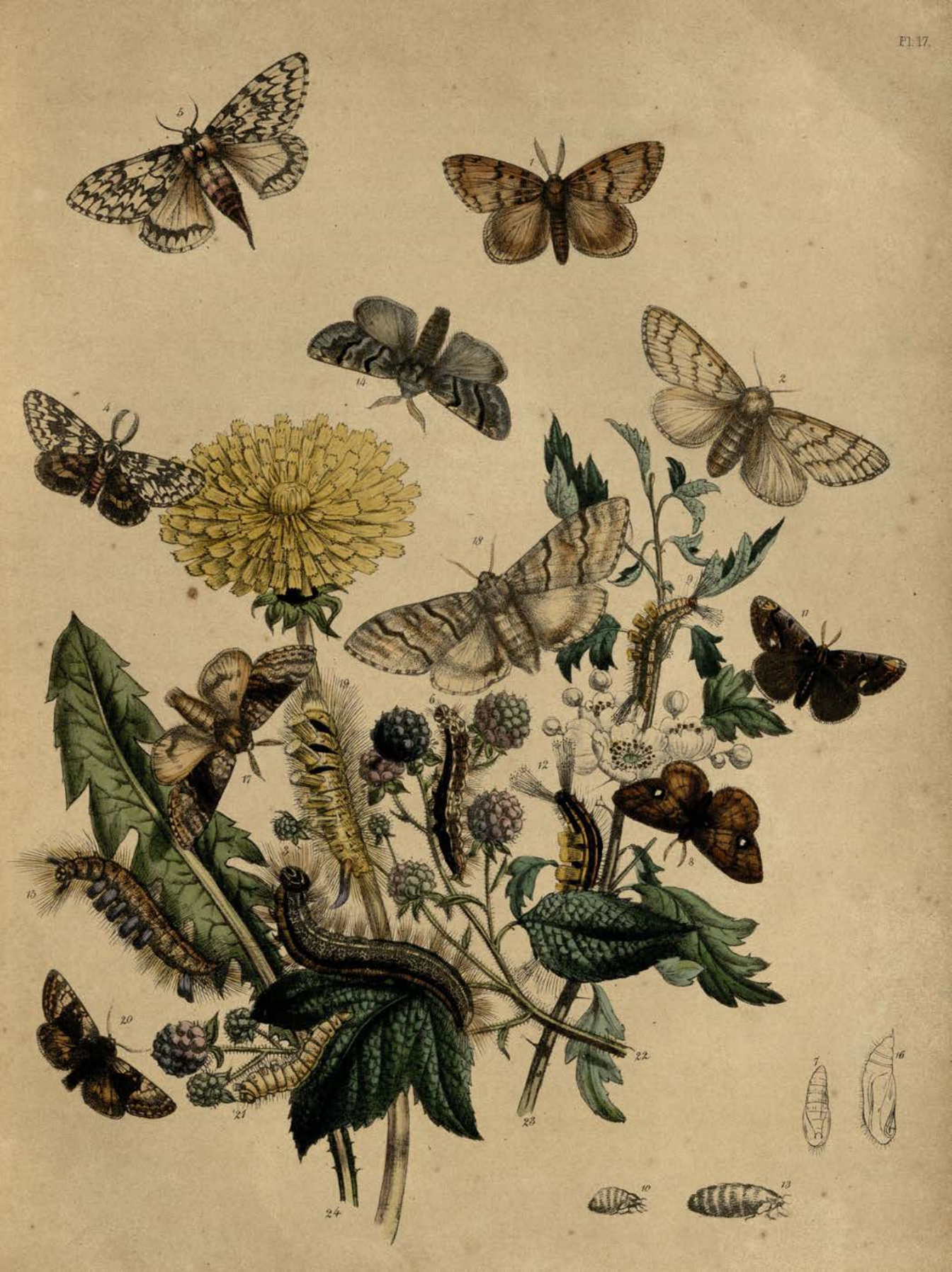
Synonymes.—*Bombyx senex*, Hübner; Stephens (Nudaria s.); Curtis; Wood, Ind. Ent., pl. 7, fig. 88.

Nudaria rotunda (the round-winged Muslin), Haworth.

Paidia senex, Hübner, Verz. bek. Schm.

This species measures about ¾ of an inch in the expanse of the fore wings, which are comparatively much shorter than in the two preceding species. The male has the joints of the antennæ bisetose; the wings are of a dull, luteous, ochre colour. The anterior pair with numerous brown spots and dots, mostly placed upon the veins; some of them forming transverse curved lines; the fringe is spotted with brown; the hind wings with a dusky central lunule, and several submarginal faint spots. This species frequents marshy places, having been found (but rarely) in Battersea Fields and Whittlesea Mere in July.

* Named from the Latin, in allusion to the nearly naked wings.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DESCRIPTION OF PLATE XVII.

INSECTS.—Fig. 1. Porthetria dispar, male (the gipsy-moth). 2. The Female. 3. The Caterpillar.
" Fig. 4. Psilura monacha, male (the black-arches). 5. The Female. 6. The Caterpillar. 7. The Chrysalis.
" Fig. 8. Orgyia antiqua, male (the Vapourer-moth). 10. The Female. 9. The Caterpillar.
" Fig. 11. Orgyia gonostigma, male (the scarce Vapourer). 13. The Female. 12. The Caterpillar.
" Fig. 14. Dasychira fascelina, male (the dark tussock). 15. The Caterpillar. 16. The Chrysalis.
" Fig. 17. Dasychira pudibunda, male (the light tussock). 18. The Female. 19. The Caterpillar.
" Fig. 20. Demas Coryli, male (the Nut-tree tussock). 21. The Caterpillar.
PLANTS.—Fig. 22. Rubus plicatus (the plaited-leaved Bramble).
" 23. Cratægus Oxyacanthus (the common Hawthorn).
" 24. Leontodon Taraxacum (the common Dandelion).

Porthetria dispar and Orgyia gonostigma are from specimens in the British Museum; all the others are from specimens liberally furnished for the purpose by Mr. H. Doubleday. The larva of D pudibunda is drawn from one taken last season by Mr. Parrell, of the Museum; that of O. antiqua is also drawn from nature; that of D. coryli is from Wilkes, and the others are from Hübner. I have not figured the female of D. fascelina, as it scarcely differs from the male, except in size; it is in general nearly one-fourth larger. H. N. H.

We are now arrived at the more typical species of the present sub-family, Arctiides, distinguished by the more densely squamose wings, the broadly pectinated antennæ of the males, and the very hairy caterpillars, which are sometimes, moreover, ornamented with thick tufts of hair on the back. The Chrysalides are often clothed with delicate hairs. They constitute Ochsenheimer's three genera Liparis, Orgyia, and Eyprepia; and the tribes Chelonides and Liparides of Boisduval, which Mr. Stephens has, perhaps too extensively, separated into the following genera—of which the first four have the spiral tongue obsolete:—Demas, in its developed tongue and opaque wings, and its tufted larva, forming a connecting link between them and the typical Arctiæ and allies; Lælia, Stilpnotia, Leucoma, Phragmatobia, and Cycnia have the wings more or less diaphanous; whilst Hypercompa, in its elongated tongue, approximates to the Lithosiidæ.

PORTHETRIA, HÜBNER. HYPOGYMNA, STEPHENS, NEC HÜBNER, VERZ.

This genus has the spiral tongue obsolete, the wings fully developed in both sexes and opaque; the anterior tarsi simple and slender; the body of the female is robust and obtuse at the tip, which is thickly clothed with wool. The caterpillars are cylindric, hairy, and furnished with tubercles, emitting long pencils of hairs, especially on the sides of the head and tail.

SPECIES 1.—PORTHETRIA DISPAR. PLATE XVII., FIG. 1, 2, 3.

SYNONYMES.—*Phal. (Bomb.) dispar*, Linn.; Wilkes, pl. 42; Donovan, 5, pl. 163.
Bombyx disparus, Haworth.
Hypogymna dispar, Stephens; Curtis; Wood, Ind. Ent., t. 6, fig. 54, 54.
Porthetria dispar, Hübner, Verz. bek. Schm.

This species varies from 1½ to 3 inches in expanse; the male being of a dusky brown colour, and the female white; being similarly marked in both sexes with several slender waved fasciæ, the markings of which towards the costa are more decided. Varieties occur not only in the ground colour of the wings, the males having the wings sometimes pale brown, and the females dusky, but also in the depth of the colour of the markings, which are also sometimes almost obliterated. The caterpillar is dusky, irrorated with black spots, with a pale dorsal line, and the sides above the feet whitish; the fore part also spotted with blue, and the hind part with red. They feed on the oak, lime, elm, and other trees, from June to August. It occurs in great profusion in the Huntingdonshire fens, and has also been found in the neighbourhood of London.

PSILURA*, Stephens. LYMANTRIA, Hübner.

This genus is far too nearly allied to the preceding, with which it agrees in the tubercled setigerous larvæ, and in the porrected, clavate palpi and antennæ of the males, with the wings ornamented with dark waved streaks. It differs, however, in the more slender and acuminated abdomen of the females, furnished with a long, exserted ovipositor, with which the eggs are deposited uncovered; whereas in the preceding they are enveloped in wool stripped from the extremity of the body of the parent.

SPECIES 1.—PSILURA MONACHA. Plate XVII., Fig. 4—7.

Synonymes.—*Phal. (Bomb.) Monacha*, Linnæus; Haworth; Wilkes, pl. 39; Donovan, 7, pl. 227; Curtis, pl. 767 (Hypogymna m.); Wood, Ind. Ent., pl. 6, fig. *55*; Duncan, pl. 19, fig. 1, 2.

This handsome insect varies from 1¼ to nearly 2½ inches in the expansion of the fore wings, which are of a creamy white colour, with several black spots at the base, and four very much indented, curved, black streaks dilated on the costa; the two middle ones being contiguous together beyond the middle of the wing, and preceded by a black dot and angulated line in the discoidal cell. The fringe is spotted with black; the hind wings are dusky, but vary in the depth of the tint, with a submarginal darker band, and a marginal row of black dots; the abdomen of the female has the terminal segments (except the last one) pink, spotted with black.

The caterpillar is ashy brown, with tufts of reddish hairs on the back, and a black heart-shaped spot on the second segment of the body. It feeds on the Scotch fir, bramble, birch, apple, oak, etc., in June and July, and the moth appears in July and August. It is by no means a rare insect, occurring in various parts of the south of England.

ORGYIA†, Ochsenheimer. GYNAEPHORA, Hübner.

This genus Orgyia, as originally proposed by Ochsenheimer, and retained by Boisduval, was intended to comprise those species of this family in which the larvæ are furnished with thick tufts of hair on the back,—and which is the case with the following species, namely, Bombyx antiqua and gonostigma (gen. Orgyia, Steph.), fascelina and pudibunda (gen. Dasychira, Steph.), Coryli (gen. Demas, Steph.), cœnosa (Lælia), and V. nigrum (Leucoma, Steph. spec. typ.) B. Salicis in this respect belongs, therefore, to a distinct section, and cannot be retained in the same group with V. nigrum.

As restricted by our English authors, Orgyia comprises those species which fly by day, with a vapouring kind of motion (whence their English name of the Vapourers), which have unwieldy partners, furnished with only very slight rudiments of wings, and therefore incapable of flight. They further differ from the two preceding groups in their tufted larvæ and thick pilose fore feet; from Dasychira they differ in their day-flying habits, subapterous females, and short triangular wings of the males; and from the subsequent genera in the want of a spiral tongue.

SPECIES 1.—ORGYIA ANTIQUA. Plate XVII., Fig. 8, 9, 10.

Synonymes.—*Phal. (Bomb.) antiqua*, Linnæus; Haworth; Albin, pl. 89, fig. a—e; Wilkes, pl. 64; Harris, Aurelian, pl. 20, fig. h—p; Donovan, vol. i. pl. 16; Stephens (Orgyia a.); Wood, Ind. Ent., pl. 6, f. 59, pl. 7, fig. 59.

The male of this common moth varies from 1⅛ to 1½ inch in the expanse of the fore wings, which are of a red-brown, with dusky clouds and two undulated strigæ, the second of which terminates in a kidney-shaped white

* Derived from ψιλός, nudus, and οὐρά, cauda, in allusion to the pointed naked tail of the females.

† Derived from the Greek ὀρέγω, extendo, and γνῖον, pes, from the mode in which the moths sit, with their fore feet extended.

spot near the anal angle of the fore wings, and with a pale, clay-coloured, crescent-shaped, discoidal spot. The hind wings are dark orange-brown. The female is dull ashy coloured, with the rudiments of wings very pale.

The caterpillar is very handsome, being dark grey, with red setigerous tubercles, and with four thick, whitish tufts of hair on the back, and with long pencils of feathered hairs at the sides of the head, at the sides of the body (which have a pale yellowish line above the feet), and over the tail. Those of the males, according to Duponchel (Icon. Chen. Noct., pl. 6), have the ground colour of the body much darker than in the female, which is varied with grey and pale yellow. They feed on a great variety of trees, and are found throughout the summer, the moths appearing in the autumn, and flying during the day even in the middle of London.

SPECIES 2.—ORGYIA GONOSTIGMA. Plate XVII., Fig. 11, 12, 13.

Synonymes.—*Phal.* (*Bomb.*) *gonostigma*, Linn.; Haworth; Albin, pl. 90, fig. a—d; Wilkes, pl. 65; Harris, Aurelian, pl. 14, fig. a—g; Donovan, 9, pl. 316; Curtis, Brit. Ent., pl. 378; Wood, Ind. Ent., pl. 7, fig. 60, 60.

The males of this handsome species vary from 1¼ to 1½ inch in the expanse of the fore wings, which are of a rich orange-brown, with the base spotted with ferruginous, two dusky curved and waved stripes, between which on the disk is a duplex oval spot, the costa being pale. Near the tip of the wings are three white patches, preceded by fulvous dashes, and there is an ear-shaped white mark near the anal angle. The fringe is spotted with dark brown. The under wings brown, with pale fringe. The female is dark reddish-brown, with ochre-coloured tarsi and antennæ.

The caterpillar is brown, with rich red longitudinal stripes, with four thick tufts of short yellow hairs on the back, and several pencils of clavate hairs.

The species is rare, but occurs in the south of England, appearing at the same periods as the preceding.

DASYCHIRA*, Stephens, nec Hübner. ORGYIA, Hübner, Verz.

Like the last-described genus, this present has the spiral tongue obsolete, and the fore legs broad and pilose, in which respect it differs from the succeeding genera, whilst its tufted larvæ removes it from Porthetria and Psilura. From Orgyia it is at once distinguished by the females being furnished with fully-developed wings; and from Demas, by the thorax not being crested.

SPECIES 1.—DASYCHIRA FASCELINA. Plate XVII., Fig. 14, 15, 16.

Synonymes.—*Phal.* (*Bomb.*) *fascelina*, Linnæus; Haworth; Donovan, vol. xvi. pl. 576; Albin, pl. 26, fig. 39, e—h; Wilkes, pl. 32; Stephens (Dasychira f.); Wood, Ind. Ent., pl. 6, fig. 56. *Bombyx medicaginis*, Hübner, Bomb., pl. 21, fig. 81.

This species varies from 1¾ to 2⅛ inches in the expanse of the fore wings, which are dark grey, with a blackish spot, edged with orange at the base; two curved dark fasciæ (one before and one behind the middle of the wing, mottled with orange), between which is a pale oval spot enclosing a dark dot; beyond the second fascia is a broadish, irregular, dusky stripe, edged with a dentate line. The hind wings are pale grey, with a slight dusky subapical fascia.

The caterpillar is brownish, spotted with yellow, and with five pale tussocks on the back, two near the head and one at the tail. It feeds on numerous and very dissimilar plants throughout the autumn and winter; and the moth, which is by no means rare, appears in July.

SPECIES 2.—DASYCHIRA PUDIBUNDA. Plate XVII., Fig. 17, 18, 19.

Synonymes.—*Phal.* (*Bomb.*) *pudibunda*, Linnæus; Haworth; Donovan, vol. v. pl. 160; Albin, pl. 26, fig. 38, a—d; Wilkes, pl. 63; Harris, Aurelian, pl. 15; Stephens (Dasychira p.); Wood, Ind. Ent., pl. 6, fig. 57. *Bombyx juglandis*, Hübner, Bomb., pl. 21, fig. 84, 85.

This common species varies from 1¾ to 2½ inches in the expanse of the fore wings, which are of a whitish-grey

* Derived from the Greek, in allusion to the hairy outstretched fore feet of the moths.

colour, thickly irrorated with dusky scales, especially in the males. The base of the wings is marked with a slight dentate stripe, which is very indistinct in the females. There are two slightly-curved, dusky, slender fasciæ (one before and the other beyond the middle of the wing), the space between which is much darker in the males, and bears an oval, discoidal, paler spot; parallel with the outer margin runs a waved slender stripe (very indistinct in the females), and the fringe is spotted with dusky.

The caterpillars, which, from frequenting hop-plantations, are well known under the name of Hop-dogs, are yellow, with the head clay-coloured, several large whitish tufts of hairs on the back (the articulations between which are black), and a larger reddish one on the tail. It feeds on various plants in the autumn, and the moth appears in May and June.

DEMAS, Stephens. COLOCASIA, Ochsenheimer.

This genus has distinct but very short palpi, as well as a spiral tongue; the antennæ rather long, and only moderately bipectinated in the males; the wings are densely squamose; the thorax is distinctly crested, the abdomen tufted, and the larvæ have several dorsal tussocks of hairs.

SPECIES 1.—DEMAS CORYLI. Plate XVII., Fig. 20, 21.

Synonymes.—*Phal. (Bomb.) Coryli*, Linnæus; Haworth; Donovan, 9, pl. 309; Albin, pl. 90, fig. e—h; Wilkes, pl. 66; Stephens (Demas C.); Wood, Ind. Ent., pl. 6, fig. 58.

This species measures from 13 to 18 inches in expanse of the fore wings, which are of a rusty brown colour; the base ashy grey, followed by a broad bar occupying the middle of the wing, but paler towards the costa, bounded on each side by a dark waved streak, and enclosing a discoidal black ring, and various irregular dark lines; the hind portion of the wings is pale, with an undulated brownish stripe running parallel with the outer margin of the wings. The hind wings are paler, generally with a dusky subapical fascia. The various markings, however, vary considerably in different individuals.

The caterpillar is red, with two red tufts of hairs on the back, and elongated fascicles of hair on the neck. It feeds on the birch and hazel. It appears in May and September, and the moth in April and July. It occurs, but rarely, in woods round London, as well as in other parts of the kingdom.

DESCRIPTION OF PLATE XVIII.

Insects.—Fig. 1. Leucoma vau-nigrum (the black V Satin moth).
" Fig. 2. Stilpnotia Salicis (the satin moth). 3. The Caterpillar. 4. The Chrysalis.
" Fig. 5. Lælia Cœnosa (the Whittlesea tussock). 6. The Caterpillar.
" Fig. 7. Porthesia auriflua, male (the Gold-tailed moth). 8. The Caterpillar.
" Fig. 9. Porthesia Chrysorrhœa, male (the Brown-tailed moth). 10. The Female. 11. The Caterpillar.
" Fig. 12. Spilosoma Menthastri the large ermine). 13. The Caterpillar.
" Fig. 14. A variety of S. Menthastri, by some made a species, S. Walkerii.
" Fig. 15. Spilosoma Papyratia (the water ermine).
" Fig. 16. Spilosoma Papyratia, var. Urticæ (the dingy white ermine).
" Fig. 17. Spilosoma Lubricepeda (the spotted buff ermine). 18. The Caterpillar.
" Fig. 19. A variety of S. Lubricepeda, by some made a species, S. radiata.
" Fig. 20. Cycnia mendica, male (the spotted muslin). 21. The Female. 22. The Caterpillar.
Plants.—Fig. 23, 23. Salix Doniana (Don's Willow).
" Fig. 24. Sparganium ramosum (the Burr-reed).
" Fig. 25. Prunus spinosa (the Sloe).
" Fig. 26. Mentha rubra (the red Mint).

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L. Vau-nigrum, S. Papyratia and its variety, Urticæ, are from specimens in the British Museum; L. cœnosa is from the cabinet of Mr. Stephens; the varieties of S. lubricepeda and S. Menthastri are from the cabinet of Mr. Bentley; the *S. radiata* is a fresh female specimen, much finer than the original male specimen of the Haworth cabinet (also in possession of Mr. Bentley), but perfectly agreeing with it in the general character of the markings; all the others are from specimens furnished by Mr. H. Doubleday. The caterpillar of P. chrysorrhœa is drawn from nature; that of L. cœnosa is from Curtis; all the others are from Hübner. H. N. H.

LÆLIA, Stephens. (ORGYIA, p. Boisduval.)

In this genus we find the caterpillar (fig. 6) closely resembling that of the Vapourer moths (pl. 17, fig. 9 and 12), which has evidently induced Boisduval to unite its type with that genus; from which it may, however, be distinguished by its very differently-formed wings, longer antennæ, with the branches terminated by several diverging bristles, and winged females; which, nevertheless, in their robust bodies and comparatively short wings, as compared with those of the males (a striking peculiarity), evidently show an approximation to the Vapourers. The caterpillars, moreover, construct an opaque, nearly oval, cocoon.

SPECIES 1.—LÆLIA CŒNOSA. Plate XVIII., Fig. 5 and 6.

Synonymes.—*Bombyx cœnosa*, Hübner; Curtis, Brit. Ent., 2, pl. 68; Wood, Ind. Ent., tab. 7, fig. 61.

This species measures 1½ to 1¾ inch in the expanse of the fore wings, which in the males are, together with the head and thorax, of a pale, ochre-brown, with a slightly defined row of brownish subapical spots. The abdomen and hind wings are paler. The female is white, slightly tinged with buff.

The caterpillar is black, thickly clothed with yellowish hairs, and with four thick yellow tufts down the back, and two long black pencils of hairs at the head and tail. It feeds on the Butomus umbellatus in July, and the moth appears in the same or the following month. It has hitherto occurred only in the fens of Whittlesea Mere.

Arcturus Sparshalii (Curtis, Brit. Ent., pl. 336; Wood, Ind. Ent., tab. 7, fig. 63), a cream-coloured insect, with orange-coloured antennæ, and a very long fascicle of hairs at the tail, was stated by Mr. Curtis to have been captured by Mr. Sparshall in a lane near Horning, on the 7th of August, 1829; but from information given to me by Mr. Edward Doubleday, received from Mr. Sparshall himself, there is great reason to fear some confusion of specimens had taken place. Indeed, Boisduval expressly states that the insect is American—"Habitat Americam et erronea ut species Anglica adscriptus," Gen. et Ind. Lep., p. 67. In the veins of the fore wings it does not agree with any of the more typical Arctiidæ. It is therefore omitted from the present work.

LEUCOMA*, Stephens. (ORGYIA, p. Boisduval. LARIA, p. Hübner.)

This genus is distinguished from all the preceding by the snowy whiteness of the wings, which are but sparingly covered with scales; the palpi are short and acute; the body is not spotted, and the back not crested. From the next genus it is at once separated by the caterpillars, which have tufts down the back, but without pencils of elongate-clavate hairs.

SPECIES 1.—LEUCOMA VAU-NIGRUM. Plate XVIII., Fig. 1.

Synonymes.—*Bombyx Vau-nigrum*, Fabricius; Haworth; Ochsenheimer; Stephens (Leucoma V-n.); Wood, Ind. Ent., t. 7, fig. 62.
Bombyx nivosa, Hübner.

This species measures 1¾ inch in the expansion of the wings, which are snowy-white, the anterior marked

* Named from the Greek, in allusion to the white colour of the moth.

with a small black V-like mark in the centre towards the costa; the veins are luteous; the antennæ have the rays yellowish; and the thorax and abdomen are white (or deep tawny or fulvous, as described by Mr. Haworth).

The caterpillar is dirty reddish or brown, with eight tufts on the back, of which the two anterior and three posterior are whitish. It feeds on the lime, and the moth appears in the middle of August. The chrysalis is green, with a black spot on the thorax. The species is extremely rare in this country; but has been found near Darenth, Kent.

STILPNOTIA*, Westwood. (LEUCOMA, p. Stephens. LIPARIS, p. Boisduval.)

If any weight is to be given to the peculiarities in the larva state in the determination of the genera of this family, Bombyx Salicis, Linn., must be separated from the preceding, as its caterpillar is destitute of tufts of hairs on the back, in which respect it approaches Porthesia; but the abdomen of the perfect insects of that genus is tufted, and the entire habit is different, B. Salicis having long satin-like, semi-transparent wings, the anterior pair of which exhibit a character which I do not find in any of the adjoining groups, namely, the greater distance of the terminal branches of the subcostal vein from the costa, and the much greater length of the terminal branchlet (as clearly represented in our figure 2); whereas in the other adjacent Arctiidæ the terminal branchlets are so close to the costa that the apical one is almost obsolete. The palpi are very short and pointed.

SPECIES 1.—STILPNOTIA SALICIS. Plate XVIII., Fig. 2, 3, 4.

Synonymes.—*Phalæna (Bombyx) Salicis*, Linnæus; Albin, pl. 84, fig. a—d; Wilkes, 21, pl. 51; Harris, Aurelian, pl. 5; Donovan, vol. i. pl. 30; Stephens (Leucoma S.); Wood, Ind. Ent., t. 7, fig. 64.

This species measures from 1½ to 2 inches in the expanse of the wings, which are of a pure white colour, and glossy, like satin; the branches of the antennæ black; the body black, thickly clothed with white hairs; and the legs white, with black rings.

The caterpillar is pilose and black, with a row of white dorsal patches, and small red lateral spots. The chrysalis is black, clothed with long white hairs, and inclosed in a semi-transparent cocoon. The caterpillar feeds on willows and poplars in June; and the moth, which is extremely abundant, appears in July.

PORTHESIA†, Stephens. (EUPROCTIS, Hübner.)

Like Stilpnotia, the caterpillars of this genus are destitute of dorsal tufts; bnt have long whiskers, or pencils of hairs, at the sides of the head. The moths have short, opaque, glossy wings; the abdomen tufted in both sexes, but more especially in the female; the down at its extremity being employed to envelope the eggs when deposited; the antennæ are short, and the legs very downy. The fore wings in the males differ in colour on the two surfaces.

SPECIES 1.—PORTHESIA AURIFLUA. Plate XVIII., Fig. 7 and 8.

Synonymes.—*Bombyx aurifluus*, Fabricius, Esper; Haworth (male). | Harris, Aurelian, pl. 25, fig. p—s; Donovan, 1, pl. 10; Wood, Ind. Ent., *Phalæna (Bombyx) chrysorrhœa*, Albin, pl. 87, fig. e—i; Wilkes, pl. 59; | t. 7, fig. 65—65. Haworth (female) and of the first edition of this work.

This species varies from 1¼ to 1¾ inch in the expansion of its wings, which, as well as the body, are of a pure white; the branches of the antennæ and tail golden-coloured. The male differs in having the under side of the

* Derived from the Greek, in allusion to the shining wings of the moth.

† Derived from the Greek, and alluding to the destruction often produced by the caterpillars.

fore wings brown, and with a small dusky spot near the posterior angle on the upper side, which is sometimes also slightly indicated in the female.

The caterpillar is gregarious, pilose, of a blackish colour, with two black lines down the back, and the sides fasciculated with white hairs, and a red line above the legs. It feeds on various trees—oak, elm, blackthorn, etc., in June; and the moth appears at the end of July. It is a very widely-distributed and abundant species.

SPECIES 2.—PORTHESIA CHRYSORRHŒA. PLATE XVIII., FIG. 9, 10, 11.

SYNONYMES.—*Phalæna (Bombyx) chrysorrhœa*, Linnæus; Hübner; but not of English authors.

Bombyx aurifiua, Stephens; but not of Haworth; Wood, Ind. Ent., pl. 7, fig. 66; and the first edition of this work.

Phal. (Bomb.) phœorrhea, Curtis (on Brown-tail Moth); Donovan, 10, pl. 555; Haworth; Curtis.

This species is closely allied to the preceding; but different, both in the larva and perfect state. The expansion of the wings varies from 1⅓ to 1⅔ inch. The antennæ are more strongly pectinated, and ferruginous, the hind part of the abdomen (not the tip alone) is brown, with the tuft at its extremity fulvous or brown. The wings are white (not snow-white), with the costa in the males beneath broadly brown.

The caterpillar is dusky brown, with two red dorsal lines, a white streak on each side, and with whitish lateral fascicles. It feeds on various plants, especially whitethorn, in June, and has at times become so remarkably abundant as to cause a serious panic to the Londoners, especially in 1782, when prayers were offered up in the churches against the enemy; and the churchwardens and overseers of the neighbouring villages, after ordering rewards for collecting these caterpillars, attended to see them burnt by bushels. The alarm was allayed by the little treatise of Curtis on the insect. The perfect insect appears in August.

SPILOSOMA, STEPHENS. (ESTIGMENE, HÜBNER.)

This group is at once distinguished (as its generic name and the ordinary English name of Ermine Moths given to its species import) by its spotted abdomen, the spots being arranged in five longitudinal rows. The palpi are as long as the head, with the last joint oval. The thorax is not crested; the wings opaque, and covered with scales; the spiral tongue distinct, but short, and the antennæ are but slightly bipectinated. The species are liable to considerable variation, in the extent of the black markings on the wings.

SPECIES 1.—SPILOSOMA MENTHASTRI. PLATE XVIII., FIG. 12, 13, 14.

SYNONYMES.—*Bombyx menthastri*, Fabricius; Donovan, 6, pl. 189; Stephens (Spilosoma M.); Wood, Ind. Ent., t. 7, fig. 73.

Phalæna (B.) lubricepeda ♀, Linnæus; Wilkes, pl. 40; Harris, Aurelian, pl. 38, fig. k—l; Albin, pl. 24, fig. g—k.

Phalæna Erminea, Marsham; Linn. Transactions, i. pl. 1, fig. 1; Haworth.

Estigmene Menthastri, Hübner, Verz. bek. Schmett.

This common insect varies from 1½ to nearly 2 inches in the expanse of its wings, which are of a fine cream colour, or very pale buff, with numerous black spots scattered over the fore wings, and a very few, often larger, on the hind ones. The head and thorax are white; the abdomen orange, with the tip white, and with five rows of black dots, one dorsal, two lateral, and two ventral. The male antennæ are white, with the rays black. The markings of the wings are liable to very great variation, being sometimes almost wanting, and sometimes of an unusually large size, becoming more or less confluent, as in our figure 14, which is copied from Mr. Curtis's figure of his species, Sp. Walkerii, which is, however, regarded by the best lepidopterists as a variety only of the present species. An intermediate variety is figured by Stephens (Haustell, pl. 16, fig. 3).

The caterpillar is brown and pilose, with a reddish dorsal line; it is found in August, feeding upon a great variety of plants, and the moth appears at the beginning of the following May.

SPILOSOMA URTICÆ (?), (Haworth, Stephens, Wood, Ind. Ent., pl. 7, fig. 74, and our pl. 18, fig. 16,) appears to me to be another variety of Sp. Menthastri, from which it is chiefly distinguished, according to Mr. Stephens, by "the antennæ being white, with dusky radii, the abdomen very slightly fulvescent, and the greater purity of the white colour of the wings." This description is evidently made from Mr. Stephens's male specimen; but it is to be observed, contrary to Mr. Stephens's description, that the antennæ of the males of Menthastri, in fine condition, are white, with dark rays. Mr. Stephens further mentions that his specimen differs from Sp. Papyratia in form, whereas the Urticæ of the continental authors is identical with Papyratia.

SPECIES 2.—SPILOSOMA LUBRICEPEDA. PLATE XVIII., FIG. 17, 18, 19.

SYNONYMES.—*Phalæna (Bombyx) lubricepeda*, Linnæus; Marsham, Linn. Trans., 1, pl. 1, f. 2; Donovan, 16, pl. 568; Albin, pl. 24, fig. 35, a—e; Wilkes, pl. 49; Harris, Aurelian, pl. 17, fig. g—e; Wood, Ind. Ent., pl. 5, fig. 76.

This abundant species measures from $1\frac{1}{2}$ to $1\frac{5}{8}$ inch in the expanse of its fore wings, which are of a yellowish-buff colour, varying in depth of tint, with an interrupted oblique row of spots beyond the middle, and various other spots, one being on the costa towards the base, and another beyond the middle; a spot being also mostly visible at the extremity of the discoidal cell. The hind wings are rather paler, with two or three black dots. The head and thorax are buff, and the abdomen orange, with black spots.

The spots on the wings are very variable, being sometimes almost obsolete and sometimes dilated and running together into long patches, as in our fig. 19, which represents a specimen of the supposed species, Sp. radiata, of Haworth. I possess a specimen from Mr. Haworth's cabinet exactly intermediate between these two extremes.

The caterpillar is brown and hairy, with the sides paler, the dark back separated by two blackish longitudinal lines. It feeds on various herbaceous plants in August, and the moth appears in the following June.

SPECIES 3.—SPILOSOMA PAPYRATIA. PLATE XVIII., FIG. 15, 16.

SYNONYMES.—*Phalæna papyratia*, Marsham in Linn. Trans., 1. pl. 1, fig. 4; Donovan, vol. xvi. pl. 571; Albin, pl. 21, fig. 30, e—h; Wood, Ind. Ent., pl. 7, fig. 75. *Bombyx Urticæ*, Hubner; Esper; Ochsenheimer; Godart.

This rare species measures rather more than $1\frac{1}{2}$ inch in the expanse of the wings, which are of a pure white hue; the anterior with two or four spots on the disc, and a slight row of dots near the tip; often, however, wanting: the hind wings, occasionally, with a very few dark dots. The antennæ of the males are white, with black rays. The abdomen is orange-coloured, with black spots, and the tip white.

The caterpillar is brown and fulvous, with a few black spots. It feeds upon various water plants, and the moth appears in June in marshy places, but is of comparatively rare occurrence.

CYCNIA, HÜBNER. (DIAPHORA, STEPHENS.)

This genus differs from the preceding in the semi-transparency of the wings, which differ remarkably in colour in the opposite sexes, and in the slightly spotted abdomen. The palpi are small, with the third joint of equal length with the preceding; the antennæ in the males are but moderately bipectinated.

SPECIES 1.—CYCNIA MENDICA. PLATE XVIII., FIG. 20, 21, 22.

SYNONYMES.—*Phalæna (Bombyx) mendica*, Linnæus; Marsham, Linn. Trans., 1, pl. 1, f. 3; Donovan, vol. ii. pl. 388; Harris, Aurelian, pl. 35, fig. m; Wood, Ind. Ent., pl. 7, fig. 77, 78.

This singular species varies from $1\frac{1}{6}$ to $1\frac{1}{2}$ inch in the expansion of the wings. The male is entirely brown;

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the female white; the fore wings in both sexes with a few (generally six, seven, or eight) black spots, which are, however, occasionally obsolete. The hind wings also vary in the number of black spots.

The caterpillar feeds upon aquatic plants in the autumn. It is of an ashy colour and hairy, and the moth appears in marshy places in May following; but it is a rare species, although widely distributed throughout the country.

DESCRIPTION OF PLATE XIX.

INSECTS.—Fig. 1. Phragmatobia fuliginosa (the ruby Tiger-moth). 2. The Caterpillar.
" Fig. 3. Pachythelia nigricans.
" Fig. 5. Arctia caja (the garden Tiger-moth), a female. 6. The Caterpillar. 7. A pale variety, a male. 8. A dark and singular variety, a female.
" Fig. 9. Arctia villica (the cream-spot Tiger-moth). 10. The Caterpillar.
" Fig. 11. Euthemonia russula (the clouded buff), male. 12. The female. 13. The Caterpillar.
" Fig. 14. Nemeophila Plantaginis (the small Tiger-moth). 15. The Caterpillar.
" Fig. 16. Heraclia Dominula (the scarlet Tiger-moth). 17. The Caterpillar.
" Fig. 20. Callimorpha Jacobææ (the pink underwing moth). 21. The Caterpillar.
" Fig. 22. Miltochrysta miniata (the red arches).
PLANTS.—Fig. 23. Primula veris (the Cowslip).
" Fig. 24. Plantago major (common Plantain).
" Fig. 25. Scabiosa arvensis (the meadow Scabious).
" Fig. 26. Senecio vulgaris (common Groundsel).
" Fig. 27. Cynoglossum officinale (common Houndstongue). The white flower without a number is Cerastium arvense (field Chickweed).

Figs. 1, 9, 11, 12, 14, 16, 20 are from specimens furnished by Mr. H. Doubleday. Fig. 8 is a very singular variety of A. caja, in the British Museum; and 7, another singular variety of this species, is from a drawing furnished to Mr. Westwood by Mr. T. Reeves, jun., of a variety found near Carlisle. The female of N. Plantaginis differs from the male but slightly, principally in having the innermost dark stripes of the hind wings continued to the interior margin of the wings, giving the insect a somewhat blacker appearance; but I have not thought it worth while to figure the female for so slight a difference. Fig. 3, P. nigricans, is from Mr. Curtis's figure, and the caterpillars are from Hübner, with the exception of those of A. caja, A. villica, and C. Jacobææ, which are from nature. H. N. H. Fig. 4 represents the caterpillar of Penthophera morio, a species improperly given by Curtis as congenerous with figure 3.

PHRAGMATOBIA*, STEPHENS. (ARCTIA, HÜBNER, BOISDUVAL.)

This genus has the abdomen also spotted, but the spots are arranged in only three rows; the spiral tongue is short, but the palpi are scarcely distinct and pilose. The wings are subdiaphanous; the antennæ short, and nearly simple in both sexes, which likewise do not materially differ from each other in colour. The caterpillar is very hairy.

SPECIES 1.—PHRAGMATOBIA FULIGINOSA. PLATE XIX., FIG. 1, 2.

SYNONYMES.—*Phalæna (Noctua) fuliginosa*, Linnæus; Wilkes, 23, pl. 49; Harris, Aurelian, pl. 27, fig. i—m; Donovan, vol. iii. pl. 80; Wood, Ind. Ent., pl. 7, fig. 72; Duncan, Brit. Moths, pl. 20, fig. 3.

This pretty species varies from rather less than an inch to an inch and a half in the expanse of the fore wings, which are red-brown, with a black spot or two at the apex of the discoidal cell; the hind wings purplish-red, with a broad dusky margin, and several blackish spots on the disc; the fringe red, as well as the abdomen, which has three rows of black dots. The spots of the wings are, however, occasionally obsolete, and the hind wings with only the inner margin red, the remainder being dusky. Harris (Exposition of Engl. Ins., tab. 8, fig. 7) and Stephens mention a variety which they think may possibly be distinct, varying in the form of the wings as well as in the larvæ—which are either dusky red with the head black, or slate colour with the head copper-coloured. They feed upon various weeds in June, and the moth appears in the following month.

* Derived from the Greek, and alluding to the larvæ, which live upon plants in hedges.

PACHYTHELIA, Westwood. (PENTHOPHERA, pars Curtis, but not of Germar.)

This curious genus is well characterised by its semi-transparent hairy wings of a uniform blackish colour, the deeply bipectinated antennæ of the males, the want of a spiral tongue, the small porrected palpi terminated by an acutely ovate joint, and the robust thorax. The females are entirely wingless, with a large fleshy body, and with very minute rudimental antennæ and legs. The arrangement of the veins of the wings agrees with Hypogymna rather than with Spilosoma, but differs from both these groups in having the postcostal vein and its branches in the fore wings pushed considerably into the disc of the wings, so as greatly to diminish the ordinary size of the discoidal cell; as we have also seen in Psyche, to which the genus is related very closely (and next to which it should be arranged in the system); especially in the transformation of the species, the caterpillars residing in moveable cases.

SPECIES 1.—PACHYTHELIA NIGRICANS. Plate XIX., Fig. 3.

Synonymes.—*Penthophera nigricans*, Curtis, Brit. Ent., pl. 213; Stephens; Wood, Ind. Ent., pl. 7, fig. 80.

The expansion of the wings of the male is $1\frac{1}{6}$ inch. It is described by Curtis as semi-transparent, hairy, brownish-black, with a yellowish tint; cilia and nervures darker, the former very short; superior wings rather long and narrow; thorax and abdomen woolly, the latter beneath, at the apex and the tarsi, silvery. The female is wingless.

A specimen of the male was beaten from a birch-tree on the outside of West Parley Coppice, Devonshire, on the 18th of June, 1824, by Mr. Dale. Within the last few years, however, the insect has been reared plentifully by Mr. S. Stevens from cased larvæ found in the New Forest.

SPECIES 2.—PACYTHELIA OPACELLA.

Synonymes.—*Psyche opacella*, H. Schäffer, Schm., t. 19, f. 102. *Psyche fenella*, Newman in Zoologist, 1850, p. xcix.

A species closely allied to the preceding, recently taken in Scotland by Mr. Weaver.

ARCTIA, Schrank. (CHELONIA, Auct. Gall. EYPREPIA, Auct. Germ.)

This genus, which corresponds with Hübner's Hypercompæ coloreæ, is perhaps the most beautiful group of the night-flying Lepidoptera. The body is robust and very hairy; the abdomen fasciated or spotted; the antennæ of the males but moderately bipectinated or dentated, and those of the females subdentate. The palpi are pilose, of moderate size, and formed into a small deflexed beak. The spiral tongue is almost obsolete. The four wings are beautifully varied with dark and white spots and rivulets. The posterior ones are rich orange, or red with black spots. The females are of equal size, or larger than the males. The caterpillars are tuberculated, the tubercles emitting long pencils of hairs, whence the name of Woolly-bears, given to them by children. They are an excellent bait for the angler. There are at least twenty European species of the genus, which Hübner has distributed into a considerable number of minor divisions. In the works of our early English systematic entomologists, several of these species were introduced. namely, Ph. Bomb. Matrulona, Linn., by Turton; Ph. B. Hebe, Linn., and Ph. B. aulica, Linn., by Martyn; and Ph. B. purpurea, Linn., by Stewart. As there appears to be no sufficient grounds for the introduction of these species we have not represented them in the present work: figures of them are given by Wood in his supplemental plates.

SPECIES 1.—ARCTIA CAJA. Plate XIX., Fig. 5, 6, 7, 8.

Synonymes.—*Ph. (Bo.) Caja*, Linnæus; Albin, pl. 20; Wilkes, pl. 36; Harris, Aurelian, pl. 13, fig. g—m; Donovan, 1, pl. 15; Haworth; Wood, t. 7, fig. 67. *Zoote Caja*, Hübner, Verz. bek. Schm.

This very common and variable species measures from $2\frac{1}{2}$ to 3 inches in the expanse of the fore wings, which are of a rich brown colour, with numerous irregular spots and streaks of cream-white; the hind wings bright

red, with blue-black spots; the thorax brown, with a red neck-band, and the abdomen red, with blue-black bars. The markings vary greatly, some specimens having the brown and blue-black portions more or less obliterated, whilst in others they are much more, and even occasionally entirely, predominant. The caterpillar is dark brown, with the hairs on the back dusky, and those on the neck and sides reddish; the head black. It feeds on various herbs, especially lettuce, strawberries, etc., in June, and the moth appears in July.

SPECIES 2.—ARCTIA VILLICA. Plate XIX., Fig. 9, 10.

Synonymes.—*Ph. (B.) villica*, Linnæus: Albin, pl. 21. fig. 29, a—d; Wilkes, pl. 37; Harris, Aurelian, pl. 4; Donovan, 2, pl. 71; Duncan, Brit. Moths, pl. 20, fig. 3; Wood, Ind. Ent., t. 7, fig. 70; West. Ent. Text-book, p. 390.
Epicallia villica, Hübner, Verz. bek. Schmett.

This handsome species varies from 2 to 2½ inches in the expanse of its fore wings, which are of a black colour, with eight cream-white spots. The hind wings orange, with black spots and marks; the head and thorax black, with a whitish patch on each shoulder. The abdomen is orange above, with the tip red, and marked with three rows of black dots; beneath black, with the base of the legs, sides, and tip of the abdomen, and costal edge of all the wings bright scarlet. The spottings vary considerably. The caterpillar is blackish, and very hairy, with the head and feet red, and spotted with fulvous. It feeds on the ragwort, chickweed, and other herbs in the spring; and the moth appears in June, especially frequenting woody places. It is far less common than the garden tiger-moth.

EUTHEMONIA*, Stephens. (DIACRISIA, Hübner.)

This group is distinguished from the preceding and following by having the fore wings unicolorous, having only a darker discoidal patch at the extremity of the discoidal cell; the palpi are small and hairy, with the basal joint smaller than the second, whereas in Caja the reverse is the case; the antennæ of the males are slightly bipectinated. The general structure of the body indicates a much greater weakness, especially in the males, which fly by day, whilst the female is smaller than the opposite sex.

SPECIES 1.—EUTHEMONIA RUSSULA. Plate XIX., Fig. 11, 12, 13.

Synonymes.—*Ph. (B.) Russula*, Linn.: Donovan, 8, pl. 214; Curtis, Brit. Ent., pl. 21; Wood, Ind. Ent., tab. 7, f. 68 and 68; Duncan, Brit. Moths, pl. 20, fig. 1.
Diacrisia Russula, Hübner, Verz. bek. Schm.
Ph. (B.) Sannio, Linn., Faun. Suec. 4; Haworth.

This pretty species varies from 1⅛ to 1⅞ inch in the expanse of the fore wings, which in the males are of an orange-clay colour, with a dark central lunule; the fore margin, towards the tip, and the outer and hind margins red, the latter with a darker streak; the hind wings pale whitish-buff, with a discoidal lunule and submarginal fascia of black, the margin itself red. The female is much darker coloured, the abdomen being black, with fulvous incisions, the fore wings dark fulvous with a red lunule and veins, the hind wings dark orange, with the base, a central lunule, and a broad submarginal fascia, black.

The caterpillar is spotted with red, and has a yellow dorsal line; the sides have also a row of whitish dots; it is thickly clothed with reddish hairs. It feeds on plantain, scabious, and various other herbaceous plants in May; and the moth appears at the end of June. It frequents open places in woods and heaths, and although nowhere common, appears to be distributed over great part of the kingdom.

* Derived from the Greek, in allusion to the elegance of the species.

NEMEOPHILA *, STEPHENS. (PARASEMIA, HÜBNER.)

The species of which this group is composed, in the colours and markings of its wings approaches the true Arctiæ, but it is distinguished from that genus by its slender form, and especially by the proportions of the joints of the very short palpi, of which the first and last joints are nearly globose; the antennæ are but slightly bipectinated in the males; the female is larger than the male. The construction, also, of the external organs of generation in the males of this genus differs considerably from that of the Arctiæ.

SPECIES 1.—NEMEOPHILA PLANTAGINIS. PLATE XIX., FIG. 14, 15.

SYNONYMES.—*Phal. (Bo.) Plantaginis*, Linn.; Haworth; Wilkes, pl. 50; Harris, Aurelian, pl. 16, fig. g—m; Donovan, 4, pl. 134; Wood, Ind. Ent., t. 7, fig. 71; Duncan, Brit. Moths, pl. 21, fig. 1. *Parasemia Plantaginis*, Hübner, Verz. bek. Schmett.

This pretty species varies from 1½ to 1⅝ inch in the expansion of the fore wings, which are of a black colour, with various cream-coloured or buff spots and markings, one being longitudinal towards the hinder margin, and terminating in an irregular cross-like margin towards the apex. The hind wings are pale orange, with black discoidal markings and an irregular black margin; the body is black, with the shoulder and sides of the abdomen buff: the thorax is also striped with buff in the males. There are numerous varieties, both in the tint of the pale parts of the wings and in the relative extent of the markings.

The caterpillar is black, thickly clothed with brown hairs, and with several of the middle segments reddish. It feeds on the plantain in the autumn and spring, and the moth (which is far from rare, and widely distributed throughout the country) appears in the beginning of June.

HERACLIA, HÜBNER, VERZ. (HYPERCOMPA, STEPH. NEC HÜBN. CALLIMORPHA, BOISDUVAL.)

This interesting genus has the head small and squamose; the antennæ in both sexes setaceous, elongate, and slightly ciliated. The palpi are shorter than the head, and the spiral tongue is distinct and convoluted, although not so regularly as ordinary. The thorax is of moderate size, and squamose, and the abdomen is elongated and rather slender; the wings are deflexed, and densely clothed with scales, and they are more elongated than in most of the preceding genera. The caterpillar is not so thickly clothed with hairs as in the preceding groups.

SPECIES 1.—HERACLIA DOMINULA. PLATE XIX., FIG. 16, 17.

SYNONYMES.—*Phal. (Noctua) Dominula*, Linnæus; Albin, pl. 22, fig. 31, a—d; Wilkes, pl. 31; Harris, Aurelian, pl. 40, fig. a—c; Donovan, 4, pl. 141; Wood, Ind. Ent., pl. 7, fig. 67; Duncan, Brit. Moths, pl. 19, fig. 3 (and 4, variety).

This beautiful insect measures about 2 inches in the expanse of the fore wings, which are of a black colour glossed with green, with about ten cream-coloured spots of different sizes on each; those which are in the discoidal cell being tinged with orange. The hind wings are rich scarlet, with black markings; the thorax is black, with two orange stripes, and the abdomen scarlet, with the back black. The size of the spots as well as the ground colour of the hind wings are very variable; our figure (16), however, represents the ordinary appearance of the insect, but striking varieties, with the scarlet colour nearly or quite obliterated, are represented in Loudon's Magazine of Natural History, vol. vi. p. 541, and by Mr. Duncan, as above referred to.

The caterpillar is black, with yellow longitudinal and dorsal lines, and numerous bluish-white lateral

*Derived from the Greek, in allusion to the species frequenting groves.

spots emitting hairs. It feeds on willow, ash, nettle, etc., and the moth appears in June; but is by no means common, although widely dispersed, having been found in Kent, Surrey, Devonshire, Dorsetshire, Hampshire, Oxfordshire, Huntingdonshire, Cambridgeshire, Yorkshire, etc.

FAMILY VIII.—LITHOSIIDÆ, STEPHENS.

This family is of small extent, and difficult location, having the body slender, the antennæ generally slender and setaceous in both sexes, but occasionally pectinated or ciliated in the males; the mouth is much better developed than in any of the preceding moths, the maxillæ being long (with the maxillary palpi exceedingly minute and bi-articulated in Deiopeia pulchella, according to Savigny) and spiral, and the labial palpi of moderate size, and three-jointed, the third joint being small, and, in some cases, apparently soldered with the preceding; the thorax is not crested; the wings of comparatively delicate texture, elongated, and when at rest, carried horizontally or convoluted, the inner margin of one of the fore wings lapping over the same margin of the other. The larvæ are cylindrical, and often hairy, with six pectoral, eight ventral, and two anal feet; they are solitary in their habits, never residing either in a case, or in a general tent-like web. In their habits the perfect insects are weak and inactive; they fly rarely by day, although the brilliant colours of some few species might indicate them to be day-fliers. Their flight is short and feeble.

The family is closely related to such of the aberrant Arctiidæ as have an elongated spiral tongue, such as Heraclia Dominula; indeed Latreille places the Lithosiæ in the same group as the Arctiæ, without any sectional division; they, however, make a very near approach to the Yponomeutidæ, as is evident from such insects as Eulepia cribrum and Yponomeuta Evonymella; hence in some of the works of Latreille, the Tineites of that author (including Yponomeuta) are placed immediately after the present family and preceding the Noctuidæ. Mr. Stephens considers them to be so closely related to the last-mentioned family, that he unites them together to form his sub-section Nocturna; but this relation appears to me to be too slight to warrant such a step. Many very splendid exotic species appear to constitute a passage between these insects and the aberrant Anthroceridæ.

CALLIMORPHA, LATREILLE (NEC BOISDUVAL). EUCHELIA, (P.) BOISDUVAL. TYRIA, HÜBNER.

Independently of the peculiarity of colouring of the type of this genus, it is distinguished by the breadth of the wings, which form a triangle when closed, the antennæ slender, those of the males emitting two short bristles from each joint; the palpi have the joints of nearly equal length, but decreasing in thickness; the spiral tongue is elongated, but not so long as the antennæ; the thorax is small, and the abdomen elongate, being cylindrical in the male, but shorter and more ovate in the female. The caterpillar is clothed with a few long straggling hairs only; it is of a pale colour, annulated with black, with sixteen feet; it changes to an obtuse chrysalis in a slight cocoon under ground.

As Latreille expressly gives Phalæna Jacobææ as the type of his genus Callimorpha, in the Règne Animal, the nomenclature of Mr. Stephens is adopted in preference to that of Boisduval, who makes Dominula the type of Callimorpha, and unites Jacobææ and pulchella into a new genus, introducing miniata (rosea) into the genus Lithosia.

SPECIES 1.—CALLIMORPHA JACOBÆÆ. PLATE XIX., FIG. 20, 21.

SYNONYMES.—*Phal. (Noctua) Jacobææ*, Linnæus; Haworth; Albin, pl. 34, fig. 55, e—i; Wilkes, pl. 55; Harris, Aurelian, pl. 4; Donovan, vol. ii. pl. 45; Wood; Ind. Ent., t. 8, fig. 91; Curtis, Brit. Ent., pl. 499; Duncan, Brit. Moths, pl. 21, fig. 2.

This handsome insect varies from 1½ to nearly two inches in the expanse of the fore wings. It is of a sooty black colour, with a scarlet subcostal bar, and two subapical spots on the fore wings. The hind wings scarlet, with a slender black edge. The under side of the wings exactly resembles the upper side in colouring—a circumstance of great rarity amongst lepidopterous insects.

The caterpillar is dark golden colour, with black rings, and a few long hairs scattered over the body. It feeds on the ragwort in the summer, the perfect insect (which is extremely common throughout the country) appearing at the end of April and May. It is of very sluggish habits, flying about in the daytime.

MILTOCHRYSTA, HÜBNER. (CALLIMORPHA, p. STEPHENS, NEC CURTIS. LITHOSIA, p. BOIS.)

The difficulty which recent lepidopterists have experienced in their location of the type of this genus, sufficiently proves its distinctness from the other types of the present family. I have, therefore, adopted for it Hübner's name, Miltochrysta. From Jacobææ, with which it is generically united by Mr. Stephens, it differs in the hairy (not silky) clothing of the body, the dilated costal margin of the fore wings, the peculiar markings and colouring of the wings, the slender palpi, acute at the tip, the caterpillars densely clothed with hairs, leaf- (not flower-) feeders, and solitary in their habits. Many of these characters will also serve to distinguish it from Lithosia, with which it is united by Boisduval.

SPECIES 1.—MILTOCHRYSTA MINIATA. PLATE XIX., FIG. 22.

SYNONYMES.—*Phalæna (Geom.) miniata*, Forster; Haworth; Stephens; Wood, Ind. Ent., t. 8, fig. 92; Harris, Aurelian, pl. 30, fig. p. *Bombyx rosea*, Fabricius; Ochsenh.; Godart; Boisduval; Donovan, 2, pl. 40, fig. inf. *Bombyx rubicunda*, Wien Verz.; Hübner, Bomb., fig. iii.

This pretty little insect varies from ten to sixteen lines in the expanse of the fore wings. Its general colour is pale salmon-buff, the fore wings being of a more rosy tint, marked at the base with a small black dot, and two slender lines running from the costa, followed (beyond the middle) by an oblique row of slender black arches, and a row of submarginal black points on the veins. The under side of the abdomen is brown in the males.

The caterpillar is short and very hairy; the hairs being plumose, verticillated, and of a grey colour, with the front of the head orange-coloured. It feeds (according to Fabricius, on the lichens) upon various trees, as birch, ash, oak; the cocoon is of silk, densely woven with the hairs of the caterpillars, and the chrysalis is acute; the perfect insect appears in June. It is not a common species, although widely dispersed, having been found in woody places in Kent, Surrey, Middlesex, Hertfordshire, Yorkshire, and Staffordshire.

DESCRIPTION OF PLATE XX.

INSECTS.—Fig. 1. Deiopeia pulchella (the crimson-speckled Footman moth). 2. The Caterpillar.
" Fig. 3. Eulepia grammica (the feathered Footman). 4. The Caterpillar.
" Fig. 5. Eulepia cribrum.
" Fig. 6. Lithosia flava (the straw-coloured Footman).
" Fig. 7. Lithosia plumbeolata.
" Fig. 8. Lithosia aureola (the orange Footman). 9. The Caterpillar.

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INSECTS.—Fig. 10. Lithosia Griseola (the dun Footman).
" Fig. 11. Lithosia Gilveola. 12. The Caterpillar.
" Fig. 13. Lithosia complanula (the common Footman).
" Fig. 14. Lithosia complana.
" Fig. 15. Lithosia helvola.
" Fig. 16. Lithosia muscerda.
" Fig. 17. Œnistis quadra (the large Footman); male. 18. The female. 19. The Caterpillar.
" Fig. 20. Gnophria rubricollis (the red-necked Footman). 21. The Caterpillar.
" Fig. 22. Philea irrorella (the Dew moth). 23. The Caterpillar. 24. A singular variety, by some called S. signata.
" Fig. 25. Cybosia mesomella (the four-spotted Footman). 26. The Caterpillar.
PLANTS.—Figs. 27, 28. Myosotis palustris (the Forget-me-not). Briza maxima (the great Quaking-grass) is figured in the middle of the plate, with figure 16 represented upon it.
" Fig. 29. Usnea florida (a common Lichen found on old trees).
" Fig. 30. Parmelia stellaris (a common Lichen found on trunks of trees).
" Fig. 31. Parmelia sinuosa (a common Lichen found on moor-stones).

The whole of the insects in this plate are from the British Museum, with the exception of L. depressa, L. plumbeolata, and L. Gilveola, from the cabinet of Mr. Stephens, L. Muscerda from Hübner, and E. grammica from a specimen of my own. The whole of the caterpillars are from Hübner. I cannot myself see very distinctly so many species in the genus Lithosia; I have, however, endeavoured to show them all as distinctly as possible in this plate, but as some of the species depend for their characters upon extreme niceties of colour, which my colourers may not always observe with sufficient accuracy, I make the following sketch of the more obvious distinctions, as I understand them. L. flava is very pale yellow, inclining to buff. L. Gilveola is a deeper and richer colour, more inclining to buff; and L. aureola is a decidedly rich orange. L. complana is pale dove colour on the fore wings, and buff on the hind wings, with a stripe of buff along the anterior margin of the fore wings, terminating in a point. L. depressa differs from the preceding in having the hind wings clouded, and the stripe on the fore wings going parallel with the edge of the wing to the end, and not terminating in a point.

L. Helvola * has the wings of a delicate dove colour, and the hind wings, light buff, shaded with brown at the edge.

L. Griseola has the fore wings of a variable dusky flesh colour, with a yellow tinge along the front margin, and the hind wings somewhat paler.

L. plumbeolata is very like Griseola, but the fore wings are somewhat more lead colour, and the hind wings a pale buff, or, as Mr. Stephens describes it, a cinereous yellow.

L. Muscerda is at once distinguishable by its spots.

Œ. quadra needs no remark. H. N. H.

DEIOPEIA, STEPHENS. (UTETHEISA, HÜBNER. EUCHELIA, P. BOISDUVAL.)

It is surprising that Boisduval should have sunk this excellent genus, which contains a great number of species scattered over the greater part of the globe, and all marked by a peculiarity of colouring quite unlike that of every other lepidopterous group. The body is slender and conical, with a slight tuft at the tip in the males. The antennæ are slightly hairy on the under side, and each joint produces two short bristles; the palpi are curved upwards in front of the head, and have the second joint much longer than the terminal one, which is oval. The spiral tongue is long, and furnished at the base with two rudimental palpi, according to Savigny; the caterpillars are hairy, and spotted with various colours, as in the perfect insect; the pupa is inclosed in a cocoon.

SPECIES 1.—DEIOPEIA PULCHELLA. PLATE XX., FIG. 1, 2.

SYNONYMES.—*Phalæna (Tinea) pulchella*, Linn.; Haworth; Stephens; Godart; Wood, Ind. Ent., pl. 8, fig. 95; Duncan, Brit. Moths, pl. 21, fig. 4.
Bombyx pulchra, Esper; Hübner; Ochsenheimer; Boisduval; Curtis, Brit. Ent., pl. 169 (Deiopeia p.)
Bombyx lotrix, Cramer.

This beautiful insect measures from $1\frac{1}{2}$ to $1\frac{3}{4}$ inch in the expanse of its fore wings, which are of a delicate cream colour, ornamented with numerous black and red spots of small size, and disposed in alternate waves running across the wing. The thorax is cream-coloured, with black dots; the hind wings white, with an irregular black border. The caterpillar is pale leaden colour, with black and red dots. It feeds on various plants, including the field mouse-ear (Myosotis arvensis). The moth has been taken in this country in September and October, but Boisduval gives June as the time of its appearance. It is extremely rare in this country,

* L. Helvola is from a continental specimen furnished to the Museum by Dr. Becker.

but has been taken near Brighton and Christchurch, as well as in Yorkshire and near Epping. The species is very widely distributed. I have received it from the island of Mauritius; and Colonel Hearsey reared great numbers of specimens from caterpillars found on the Marvel of Peru, in his garden, at Saugor, in the centre of India, although the moth had not been seen there before that plant was introduced into the garden. It is also stated to be a native of America, but probably some other species has been mistaken for it.

EULEPIA*, CURTIS. EMYDIA, BOISDUVAL.

This genus is at once distinguished by having the antennæ bipectinated in the males, as well as by the short spiral tongue and the very short palpi, with the two terminal joints of nearly equal size. The fore wings are long and narrow, and ornamented with numerous black markings. The caterpillar does not materially differ from those of the Lithosiæ.

SPECIES 1.—EULEPIA GRAMMICA. PLATE XX., FIG. 3, 4.

SYNONYMES.—*Phalæna (Bomb.) grammica*, Linn.; Haworth; Ochsenheimer; Godart; Donovan, vol. 13, pl. 450. Stephens, Illustr., 2, pl. 17, fig. 3. (Eulepia gr.) Wood, Ind. Ent., pl. 8, fig. 93.

Bombyx striata, Borkhausen (variety).
Bombyx melanoptera, Brahm. (variety).
Spiris grammica, Hübner; Verz. bek. Schmett.

This very rare and handsome species measures rather less than 1½ inch in the expanse of the fore wings, which are of a yellow clay colour, with blackish radiated stripes, and a darker transverse spot at the extremity of the discoidal cell. The hind wings dark orange, with a broad blackish border, composed of spots more or less confluent, and the base dark. The thorax is clay-coloured, with black streaks, and the abdomen orange, with several rows of black spots. As noticed in the synonymes, the species is liable to considerable variation in the spots of the wings. The caterpillar is dark brown, with an orange dorsal line, a white line on each side, and reddish tubercles emitting bundles of hairs. It feeds on Festuca duriuscula, Hieracium Pilosella, Artemisia vulgaris and campestris, Prunus spinosa, Erica vulgaris, and various other plants, in May, and the moth is stated by Boisduval and Ochsenheimer to appear in June and July. It is extremely rare in this country, but specimens have been taken in September and October at Windsor, and in the Isle of Anglesea.

SPECIES 2.—EULEPIA CRIBRUM. PLATE XX., FIG. 5.

SYNONYMES.—*Phal. (Bomb.) cribrum*, Linn.; Hübner; Esper; Borkh.; Ochsenh.; Curtis, Brit. Ent., pl. 56; Wood, Ind. Ent., pl. 8, fig. 94.
Coscinia cribrum, Hübner, Verz. bek. Schmett.

This pretty species measures rather less than 1½ inch in the expanse of its fore wings. It is of a pale grey-white, the fore wings with five curved fasciæ, formed of black spots running across the wings, with two longitudinal black lines, and several spots along the apical margin of the wing. The hind wings dark brown, with the disc paler; the body spotted with black; the apex of the abdomen yellowish.

The species has been found on heaths in Hampshire (Parley Heath and Ringwood), by Messrs. Bentley and Dale.

LITHOSIA, FABRICIUS. (SETINA, SCHRANK.)

We are now arrived at an extensive group of plain and uniformly coloured insects, distinguished by the length and narrowness of their fore wings, which are convoluted in repose. The antennæ are slender and simple,

* Derived from the Greek, in allusion to the pretty disposition of the scales in the fore wings.

each joint emitting two short bristles. The spiral tongue is long and convoluted; the palpi very short and two-jointed; the terminal joint very minute; the body slender. The caterpillars are long, cylindrical, and more or less hairy, with sixteen feet; they form an oval cocoon.

SPECIES 1.—LITHOSIA FLAVA. PLATE XX., FIG. 6.

SYNONYMES.—*Lithosia flava*, Fabricius; Haworth; Stephens; Wood, Ind. Ent., pl. 8, fig. 99.
Lithosia stramineola, H. Doubleday, in Zool., v. 1914.

This species measures rather less than 1½ inch in the expanse of the fore wings. The general and uniform colour of the insect is very pale yellow, inclining to buff; the fore wings without the paler costa, the hind wings still paler coloured, beneath paler. The body is pale ochre-coloured. Taken, but rarely, in the Kentish woods.

SPECIES 2.—LITHOSIA GILVEOLA. PLATE XX., FIG. 11.

SYNONYMES.—*Lithosia Gilveola*, Stephens; Ochsenheimer (?); Wood, Ind. Ent., pl. 8, fig. 97.
Lithosia flava, var. Stephens' Cat. Lep. Brit. Mus., p. 61.

This insect, now (1852) regarded as a variety of L. flava, measures about 1½ inch in the expanse of the fore wings, which are of a deep rich colour, inclining to buff; the hind wings are pale ashy yellow; the body is clay-coloured, except the base of the abdomen, which is more ashy. The under side of the fore wings is marked with an ashy patch on the disc. Very rare, supposed by Mr. Stephens to have been taken either at Birch or Darenth Woods. Ochsenheimer and Boisduval give Austria as its only known European habitat.

SPECIES 3.—LITHOSIA GRISEOLA. PLATE XX., FIG. 10.

SYNONYMES.—*Bombyx griseola*, Hübner; Ochsenheimer; Boisduval; Haworth; Stephens; Wood, Ind. Ent., pl. 8, fig. 102.

This very dull-coloured insect varies from fifteen to eighteen lines in expanse; the antennæ are dirty buff; the head whitish; the thorax and fore wings of a pale dusky flesh colour, having a silky gloss and a narrow, yellowish, anterior edging; the abdomen and hind wings are of a paler dusky buff. I took this species in company with Mr. Stephens, in a lane near Ripley, in considerable numbers, on the 13th August, 1826. Mr. Stephens has also taken it near Hertford.

SPECIES 4.—LITHOSIA PLUMBEOLATA. PLATE XX., FIG. 7.

SYNONYMES.—*Lithosia plumbeolata*, Stephens; Wood, Ind. Ent., pl. 8, fig. 103 (nec Lithosia plumbeola, Hübner).
Lithosia griseola, var. Stephens' List Lep. Brit. Mus., p. 62.

Mr. Stephens described the species as similar to, but rather larger than, L. griseola (of which he now, 1852, regards it as a variety). The head bright luteous; antennæ, thorax, and abdomen cinereous; anterior wings of a pale lead-coloured ash, with the costa narrowly edged with yellowish, fringe flavescent; posterior wings above cinereous yellow, beneath paler; fringe straw-coloured. Found near London.

SPECIES 5.—LITHOSIA AUREOLA. PLATE XX., FIG. 8, 9.

SYNONYMES.—*Bombyx aureola*, Hübner; Ochsenheimer; Stephens, Illustr., 2, pl. 18, fig. 1; Wood, Ind. Ent., pl. 8, fig. 96.
Lithosia aurantia, Haworth.
Setina unita, Schrank; Esper; Illiger.

This species varies in expanse from ten to fourteen lines; the head, thorax, extremity of the abdomen, and fore wings, are of a "decidedly rich orange," the latter being broader than in the other species; the hind wings paler yellowish-orange; the antennæ and abdomen dusky, except at the tip of the latter; the fringe of all the wings orange. Beneath, the fore wings have a large discoidal patch of brown. The caterpillar is black, with two orange-coloured stripes on the back spotted with red, and some white spots on the middle and hind parts of the body. It feeds in May and June on several species of Pinus, and the moth appears in July, but is rare in this country, frequenting places where fir-trees are planted, in the south of England.

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SPECIES 6.—LITHOSIA COMPLANULA. PLATE XX., FIG. 12, 13.

SYNONYMES.—*Lithosia complanula*, Boisduval.
Phalæna (Noct.) complana, Haworth; Leach, Zool. Misc., 1, pl. 49, fig. 3; Albin, pl. 70; fig. e—h; Wood, Ind. Ent., pl. 8, f. 100, and of the first edition of this work, but not of Linnæus.
Lithosia lurideola, Treitschke (?); Stephens' List Lep. Brit. Mus., p. 62.

This is the commonest species of the genus, and measures from an inch to sixteen lines in the expanse of the fore wings, which are of a pale ashy-dove colour, with a silky gloss, the fore margin having a stripe of buff, which terminates at the tip of the wing in a point; the hind wings are pale ashy-buff; the head and front of the thorax are also buff, and the remainder of the body ashy; the fore wings beneath are ashy, with the costa and apex rather broadly buff. The caterpillar is black, with short hairs, and with two yellow dorsal stripes, spotted with red and white, and a slender red line, on each side above the feet. The cocoon is brownish, and the chrysalis red-brown. The larva feeds upon the oak, fir, ash, poplar, and other trees in May and June, and the moth (which appears to be widely distributed, and very abundant in woody places) flies in July.

SPECIES 7.—LITHOSIA COMPLANA. PLATE XX., FIG. 14.

SYNONYMES. — *Phalæna (Noctua) complana*, Linnæus; Fabricius; Ochsenheimer; Godart.
Bombyx ochreola, Hübner (?); Curtis (L. o.)
Bombyx plumbeola (?), Hübner.
Lithosia depressa, Stephens; Wood, Ind. Ent., pl. 8, fig. 101.

This species is nearly related to the preceding, but is rather longer, measuring $1\frac{1}{2}$ inch in the expanse of the fore wings, which are very narrow, and of a silvery ashy colour, with a clay-coloured fore margin of equal width throughout, and not terminating in a point as in L. complana; the hind wings ashy at the base, but gradually shaded off to the edge, which is clear yellowish; the head and front of the thorax clay-coloured, and the remainder of the body ashy. Found by Mr. Stephens at Ripley, and also taken (but very rarely) at Darenth Wood, Kent.

SPECIES 8.—LITHOSIA HELVOLA. PLATE XX., FIG. 15.

SYNONYMES.—*Bombyx Helvola*, Hübner; Stephens; Wood, Ind. Ent., pl. 8, fig. 98.
Lithosia Helvola, Ochsenheimer; Boisduval.
Noctua deplana, Esper, male; Borkhausen; Schrank.
Noctua complana, female, Esper.

This species varies from nine to fourteen lines in expanse of the fore wings, which are of a livid or dove-coloured hue; the extremity of the fore margin clay-coloured, and the hind margin ashy grey, and the hind wings are light buff, shaded off to brown along the outer margin; the head and thorax in front are clay-coloured; the fore wings beneath are dusky, with the edges clay-coloured. Found near Brockenhurst, in the New Forest, and in Norbury Park, Surrey, in great plenty, by Mr. Walton.

SPECIES 9.—LITHOSIA MUSCERDA. PLATE XX., FIG. 16.

SYNONYMES. — *Bombyx Muscerda*, Hübner; Ochsenh.; Curtis, Brit. Ent., pl. 36; Wood, Ind. Ent., pl. 8, fig. 104.
Noctua pudorina, Esper.
Nöctua cinerina, Esper.
Tinea perlella, Fabr.; Rossi.
Lithosia perla, Fabr.

The expansion of the wings of this species is $1\frac{1}{2}$ inch. The general colour of the insect is a brownish hue, tinged with fleshy buff, the fore margin being pale straw-coloured, with about five small black spots placed irregularly towards the middle of the wing; the hind wings paler ashy-grey. This very rare species has been found at the end of June in Horning Marshes, Norfolk.

SPECIES 10.—LITHOSIA LUTEOLA.

SYNONYMES.—*Bombyx luteola*, Schiffermüller; Hübner (?). *Noctua lutosa*, Esper. *Lithosia pygmæola*, H. Doubleday, Zoologist, v. 1914.

ŒNISTIS, Hübner. (LITHOSIA, Sect. †† Boisduval.)

I have adopted Hübner's name for the large footman-moth, having observed a character in that insect not hitherto noticed, which, in the present state of our knowledge of the classification of the night-flying Lepidoptera, it seems advisable to indicate more decidedly than by a note at the end of the specific description,—namely, the existence of three distinct branches radiating from the extremity of the great median vein, and the basal branch of the same vein pushed almost to the base of the wing. In the typical Lithosiæ (L. complana) there are only two branches at the extremity of the median vein. Moreover, Boisduval has separated it from the other Lithosiæ, ranking it as distinct as L. rubricollis.

SPECIES 1.—ŒNISTIS QUADRA. Plate XX., Fig. 17, 18, 19.

Synonymes.—*Phalæna (Noct.) quadra*, Linn.; Fabr.; Donovan, 9, pl. 306; Wilkes, 24, pl. 52; Wood, Ind. Ent., t. 8, f. 105 and 105. | *Lithosia deplana*, Fabr. (male). *Œnistis quadra*, Hübner, Verz.

This is the largest species in the genus, measuring from 1⅞ to 2 inches in expanse. The male has the fore wings greyish-yellow, with the apex broadly dusky, and the base more orange, the costa at the base being blue-black; the remainder of the insect is ochreous yellow. The female is entirely of the latter colour, except that each of the fore wings is marked with two large blue-black spots, which, however, are occasionally obsolete. The caterpillar is grey-black, with two yellowish dorsal lines spotted with red, separated by a dark line spotted in each segment with black; it feeds on various trees, such as the oak, birch, horse-chestnut, fir, etc., in June; and the moth appears in July, and is a widely-distributed and abundant species.

GNOPHRIA, Stephens. (ATOLMIS, Hübner.)

The insect upon which this group has been proposed agrees with the typical Lithosiæ in the elongation of its wings and short body, but differs in having three-jointed palpi, conical to the tip; dark colours and veining of its fore wing, the median vein emitting three branches, the third being furcate.

SPECIES 1.—GNOPHRIA RUBRICOLLIS. Plate XX., Fig. 20, 21.

Synonymes.—*Phal. (Noct.) rubricollis*, Linn.; Donovan, 10, pl. 350, fig. 3; Harris, Aurelian, pl. 43, fig. p; Wood, Ind. Ent., pl. 8, fig. 106.

This species varies from 1 to 1⅓ inch in expanse of the fore wings. It is of a uniform black colour, with a red neck, and the tip of the abdomen orange. The caterpillar is ashy-green, with long hairs, and with two yellow dorsal lines, and red and black spots on the sides. It feeds on lichens on various trees, in the spring; and the moth appears from the end of May to July.

CYBOSIA, Hübner.

The type of this group has been united by Mr. Stephens with Setina (Philea), from which it differs in having larger palpi and opaque wings, which give it more the habit of the true Lithosiæ; from which it differs not only in the shape of its triangular wings, but also in the form of its short thick larva. The median vein emits four branches.

Boisduval unites the type with Miltochrysta miniata, forming them into his fourth section of Lithosia. The differences, however, between the two insects warrant their generic separation.

SPECIES 1.—CYBOSIA MESOMELLA. PLATE XX., FIG. 25.

SYNONYMES. — *Phalæna (Tinea) Mesomella*, Linnæus; Turton; Boisduval.

Lithosia eborina, Fab.; Hübner; Ochsenheimer; Stephens; Haworth Wood, Ind. Ent., pl. 8, fig. 199.

Lithosia lutarella, Haworth (variety).

This species measures from $\frac{5}{8}$ to $1\frac{1}{4}$ inch in expanse. The head, fore and apical margins of the fore wings, and ciliæ of all the wings, are luteous; the remainder of the fore wings pale dove-coloured or yellowish, each with two small black spots; the hind wings are brown; and the remainder of the body is whitish. The caterpillar is thick, and of a grey colour, with a reddish head. The moth appears in June and July, and is not rare in the woods round London.

PHILEA, DALMAN. (ZETTERSTEDT. SETINA, P. STEPHENS. ENDROSA, HÜBNER.)

This genus is at once distinguished by the semi-transparency of the short, triangular, yellow-coloured wings; the palpi are three-jointed, but minute; the antennæ are setaceous and simple in both sexes, being, however, slightly ciliated in the males; the spiral tongue is moderately long. The caterpillar is short and thick. The females are smaller than the males.

SPECIES 1.—PHILEA IRRORELLA. PLATE XX., FIG. 22, 23, 24.

SYNONYMES.—*Phalæna (Tinea) irrorella*, Linn.; Turton.

Eudrosa irrorella, Hübner, Verz. bek. Schm.

Bombyx irrorea, Hübner; Ochsenheimer; Godart; Stephens, Ill., vol. ii. pl. 17, fig. 1; Wood, Ind. Ent., pl. 8, fig. 107; Zetterstedt (Philea i.)

Lithosia irrorata, Fabricius; Haworth.

This pretty insect varies from $\frac{3}{4}$ to $1\frac{1}{4}$ inch in expanse. The wings are of a luteous colour, the anterior marked with three rows of small black dots placed obliquely across the wings; the body is black, with the thorax in front and the extremity of the body fulvous; the hind wings are also marked, near the outer angle, with two or three black dots. A singular variety, having the black dots transformed into marks resembling the letters IVI, was captured by Professor Henslow. The caterpillar is described by Zetterstedt as black and hairy, with rhomboidal, dorsal, and oblong lateral spots of a pale colour, and as feeding upon lichens. The moth appears in June and July, and is a rare species, although it has occasionally been taken in some plenty in the south of England.

SPECIES 2.—PHILEA ROSCIDA (?).

SYNONYMES.—*Lithosia roscida*, Stephens; Wood, Ind. Ent., pl. 8, fig. 108 (but not of Fabricius).

This species varies from $\frac{2}{3}$ to 1 inch in expanse, and appears to be very closely allied to the preceding, from which, however, it is regarded as distinct by Ochsenheimer, Boisduval, etc. The body is black, with the front of the thorax and tip of the abdomen luteous; the front wings are of a dull pale clay colour, with three rows of black spots; and the hind wings have several dusky dots near the outer angle; the shaft of the antennæ is black; the four fore legs are blue-black above, and yellow beneath. Taken, but very rarely, near Croydon, Surrey. (The specimens formerly regarded as belonging to this species, are now considered to be only varieties of the preceding.)

OBS. — The nomenclature of the species contained in the preceding pages has been revised in the present edition of this work, and such new species as have been discovered since the issue of the first edition have been introduced into their proper places; but the great exertions which have been recently made, especially by Messrs. H. Doubleday and Stephens, to bring our nomenclature into accordance with that of the German and French entomologists, have rendered necessary such extensive modifications in the distribution of the genera and arrangement and names of the species of the following families, that it has been considered most advisable to reprint the descriptions of the Noctuidæ, Geometridæ, etc., in their present form, it being intended to give at the end of both volumes a synoptical table, showing the alterations which have been made in the nomenclature, together with the addition of the new species.—J. O. W., *June*, 1852.

FAMILY IX.—NOCTUIDÆ, Stephens.

We are now arrived at a family of very great extent, and tolerably well defined in its characters; the body being generally robust, the antennæ almost constantly simple, being but rarely pectinated or ciliated in the males, the thorax stout and often crested, and the wings of moderate size with strong nervures, and generally with peculiar ear-like spots on the disc of the fore wings; the mouth is also well developed, the spiral tongue or maxillæ being greatly elongated. The wings in repose are ordinarily deflexed at the sides of the body; the labial palpi of moderate length, terminated suddenly by a small or very slender point, the preceding being very long and compressed. The body is clothed with scales, rather than with a coating of a woolly nature. The abdomen is elongate and conical in form, and but rarely as robust as in the Bombycidæ.

The larvæ exhibit several modifications, but in the majority they are naked, with sixteen feet; in some the first, and in others, the first and second pairs of the ventral feet are wanting. The anal feet, on the other hand, are always present. They are usually solitary, not residing in a web, neither are they subcutaneous; but those of the genus Ceropacha twist up leaves similarly to those of the Tortricidæ. These larvæ usually undergo their transformations underground in cocoons, often formed of particles of earth mixed in with the silk. The pupæ are almost invariably of the ordinary conical form, with the head part rounded; those of Calophasia Linariæ (De Geer, Mémoires, vol. ii. pl. 8, fig. 1—6) and of the Cuculliæ, or Shark-moths, have the tongue-case greatly elongated.

Mr. Stephens observes, "that the typical groups of this family, as their name imports, fly only by night, and repose during the day in the crevices of the bark of trees, old walls, palings," etc.; though others fly not only by night, but also during the afternoon and at twilight. The position of the wings during repose varies much; in some groups (Triphæna, etc.) they are placed horizontally, and closely applied to the body, giving the insect a somewhat cylindrical form; in others (Catocala, etc.) they are also placed horizontally, but somewhat expanded, and forming a triangle; in others (as Plusia) they are considerably deflexed, and the thorax is greatly crested. There is also considerable diversity in the form of the wings, though in general the anterior ones are elongate-triangular, and the posterior somewhat triangular-orbiculate; some few have the posterior margins denticulated, and the anterior wings are mostly adorned with two stigmata, one more or less circular, the other kidney-shaped: a character rarely observed in any other family in this order. The colours of these insects are ordinarily very sombre, agreeing with their nocturnal habits; but in some which are accustomed to fly by day, we find the fore wings, and occasionally also the hind ones, more gaily ornamental. This is the case with the Catocalæ or scarlet underwing moths, whilst the Plusiæ are adorned with patches of silver or gold on the fore wings. Some of the latter may occasionally be observed during the day darting about and hovering over long-tubed flowers, into which they insert their long spiral tongue.

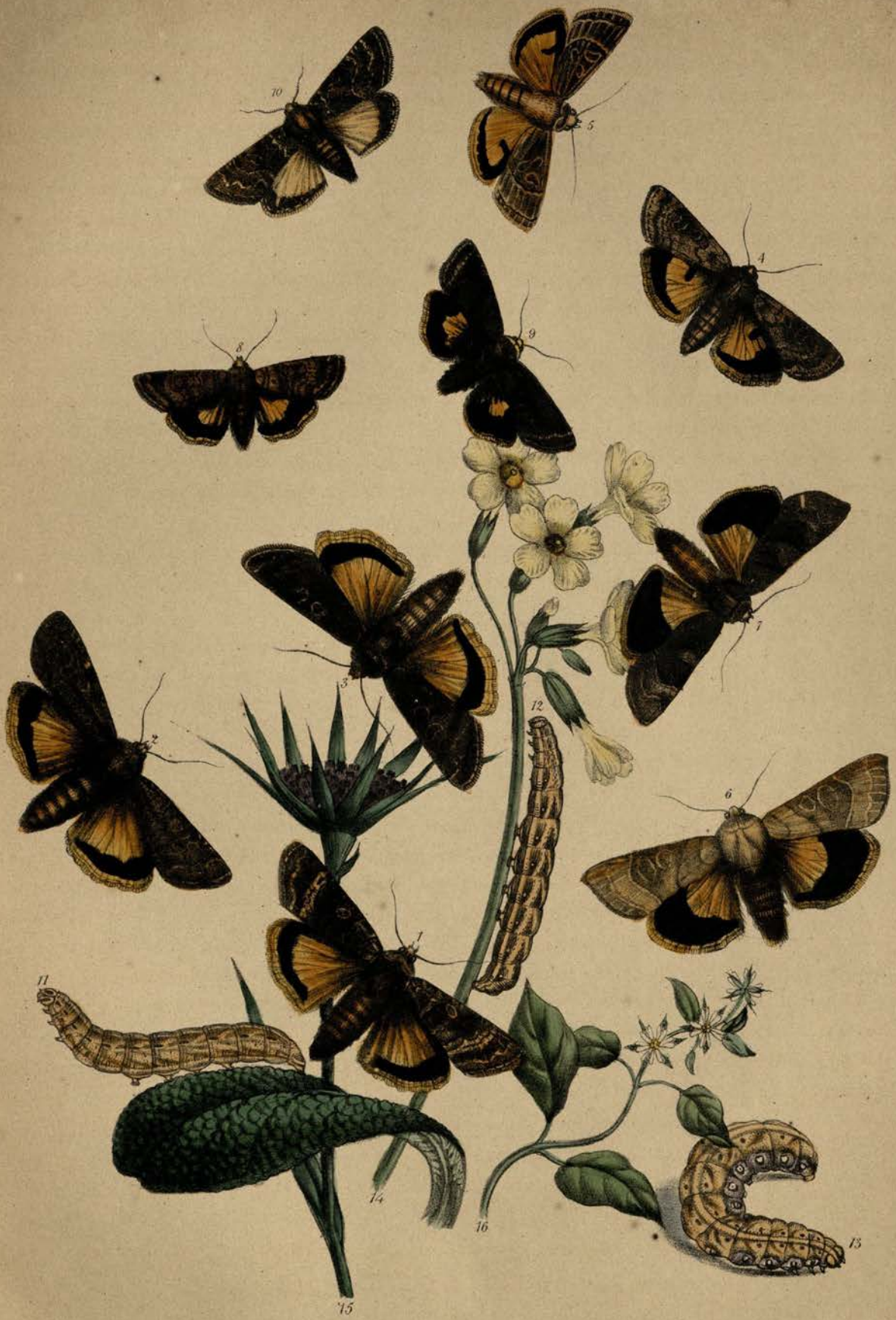
The family corresponds with the Linnæan section Phalæna Noctua, and comprises nearly 800 (of which about 400 are British) species, mostly of a large or moderate size, divided by Mr. Stephens into about eighty genera, often resting upon minute structural differences. In the work of Ochsenheimer, the family consists of forty-two genera, most of which correspond with the sections in the family proposed in the Wiener Verzeichniss. The classification of the family is certainly a matter of great difficulty, owing to the extreme similarity in the general appearance of the species, and which is greatly increased by the exotic species having been almost entirely neglected; although it is evident, from the figures of many species given by Drury, Cramer, Abbot, and Smith, etc., that the extra-European species exhibit even greater diversity of form than those of Europe.

Another great difficulty which opposes our obtaining a natural arrangement of the present family, originates in the diversities exhibited by the caterpillars, and which here appear to assume but a secondary importance. In the Sphingidæ and Geometridæ, for instance, we find the larva state affording the best characteristic of the family; but here the case is different. Plusia is, in effect, in its imago state as truly a good type of the family as Polia, Miselia, Acronycta, or Agrotis, and yet the larvæ of all these genera are strikingly distinct; some being Geometrideous, others Arctiideous, and others Noctuideous, if we consider the latter to be characterised by a naked fleshy larva, without inequalities on the surface of the body, and with sixteen feet. Of these, many are radicivorous, but they are easily distinguished from the Hepialideous larvæ, although the resemblance between the latter and those of Gortyna is very close. Some of these naked larvæ are external feeders, and have the body more coloured, and others have the eleventh segment of the body more or less angulated above. Acronycta varies in its larvæ (thus at once affording an instance of the difficulty of forming a true estimate of the value of the character of the preparatory states in these insects), being strongly hairy in A. Menyanthidis, and having an elevated horn near the extremity of the body in some of the other species. That of Dipthera Orion nearly resembles that of an Arctia, whilst Ophiusa has a naked larva greatly attenuated at each end, and Thyatira also a naked one, but furnished with a number of conical tubercles throughout the whole length of the body. Those of Catocala are strongly fimbriated at the sides of the body; in Acosmetia there are only six ventral feet, whilst in Plusia and Euclidia, which have semi-geometrical larvæ, there are only two pairs of ventral feet. Those of the last-named genus are quite vermiform in their appearance, and have the the habit of twisting themselves about in all directions.

As the classification of the groups of this extensive family has recently attracted considerable attention on the Continent, it will be useful to give a short account of the different arrangements which have been proposed. Latreille, after separating the exotic genus Erebus (in which the wings are always extended and horizontal, and the last joint of the palpi long and naked, and which comprises some of the most gigantic insects in the order), proposes to divide the remainder into two extensive and parallel series. In the first the larvæ are geometrical in their mode of progression, some having sixteen feet, but with the two or four anterior ventral feet shorter than the others; and the others have only twelve feet. The second series comprises the genera Calyptra, Cucullia, Xylina, etc., all of which have sixteen feet, the anterior ventral ones being of the ordinary size, and their progression is not geometric. Chrysoptera concha in the former series, and Erastria in the latter, appear equally to lead to the Pyralides. Catocala, Ophiusa, and Brepha, on the other hand, appear most nearly allied to Erebus. Mr. Stephens has adopted an arrangement which differs materially from those of Ochsenheimer and his followers, who he considers have placed several of the genera in unnatural situations; he has therefore attempted to arrange them in a continuous series, somewhat in accordance with their transformations, commencing with Triphæna, Agrotis and some allied groups, which he separates therefrom.

Dr. Boisduval in his new work (Genera et Index Methodicus Europ. Lepid., 1840) has separated the Noctuæ into fourteen tribes, mostly named after the leading genus in each. They are as follows:—1. Noctuo-Bombycini (Cymatophora, etc.) 2. Bombycoides (Acronycta, Bryophila, etc.) 3.* Amphipyrides (Amphipyra, Scotophila, Rusina, etc.) 4. Noctuides (Segetia, Cerigo, Triphæna, Agrotis, etc.) 5. Hadenides (Apamea, Hadena, Miselia, Polia, etc.) 6. Leucanides (Mythimna, Leucania, Nonagria). 7. Caradrinides (Caradrina, etc.) 8. Orthosides (Orthosia, Cosmia, Xanthia, etc.) 9. Xylinides (Xylina, Xylocampa, Cucullia, etc.) 10. Plusides (Abrostola, Plusia, etc.) 11. Heliothides (Anarta, Heliothis, etc.) 12. Acontides (Acontia.)

* This and all the following tribes are erroneously numbered by Boisduval.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13. Catocalides (Catephia, Catocala, Ophiusa, etc.) 14. Noctuo-Phalænides (Euclidia, Brephos, Anthophila, Erastria, etc.)

M. Guénée, who has especially studied the Noctuæ of Europe, and has published a series of papers upon the genera of these insects in the "Annales de la Société Entomologique de France," has in the last volume of that work (1841, p. 235) given a complete revision of the genera and species, which differs from that of Boisduval in several respects; for instance, he divides the group into eighteen tribes, arranged as follows:—1. Bombycoidi. 2. Noctuo-Bombycidi. 3. Bryophagidi. 4. Leucanidi. 5. Apamidi. 6. Noctuelidi. 7. Orthosidi. 8. Hadenidi. 9. Xylinidi. 10. Heliothidi. 11. Plusidi. 12. Calpidi. 13. Amphipyridi. 14. Ophiusidi. 15. Catocalidi. 16. Phalænoidi. 17. Acontidi. 18. Noctuo-Phalænidi.

The benefits resulting from this cutting up of the group into so many minor divisions, are to be found in an enlarged idea of the natural relations of the different genera. My reasons for not adopting them in this work are, first, that such an arrangement, founded only upon insects of a certain district, without the slightest reference to those of other parts of the world, must necessarily be inaccurate and unnatural; and, secondly, that it has been thought advisable in this work to follow, as far as practicable, the arrangements of recent English authors upon this order.

DESCRIPTION OF PLATE XXI.

INSECTS.—Fig. 1. Triphæna pronuba (the great yellow underwing moth). 2. The variety called Innuba. 3. A dark variety. 11. The Caterpillar.

" Fig. 4. Triphæna Orbona (the lesser yellow underwing). 12. The Caterpillar.

" Fig. 5. Triphæna subsequa.

" Fig. 6. Triphæna fimbria (the broad bordered yellow underwing). 7. A dark variety. 13. The Caterpillar.

" Fig. 8. Triphæna interjecta (the least broad border).

" Fig. 9. Triphæna Janthina (the lesser broad border).

" Fig. 10. Cerigo cytherea (the straw-coloured underwing).

PLANTS.—Fig. 15. Tragopogon porrifolius (Goat's-beard).

" Fig. 16. Stellaria media (common chickweed).

" Fig. 14. Primula elatior (the Oxlip).

The whole of the above insects are from specimens presented to me by Mr. H. Doubleday, with the exception of C. cytherea, from the British Museum, and T. subsequa, from Curtis. The Caterpillars, 12 and 13, are from Hübner. 11 is from a living specimen. The Primula elatior is from a specimen sent me by Mr. H. Doubleday, from Banfield, Essex, where there are several acres nearly covered with it, and where it constantly preserves its drooping character, and never throws up single flowers from the base, as is frequently the case with the common Oxlip, which is generally considered a hybrid. Mr. Doubleday thinks the present plant may be the true Primula elatior of Linné. It is perfectly scentless. H. N. H.

TRIPHÆNA, OCHSENHEIMER.

This very well-marked group has the antennæ simple in both sexes; the palpi reaching beyond the head, and ascending; the terminal joint very short; the thorax smooth, or but very slightly crested in front; the abdomen broad and flattish, reaching beyond the hind wings; terminated by a brush in both sexes; the fore wings narrow and elongate, with the two ordinary marks distinct; the hind wings yellow, with a broad, dark, submarginal bar. When at rest, the fore wings are carried almost flat. The caterpillars have sixteen feet, and are smooth, thick, cylindrical, somewhat attenuated in front, and fleshy, with the ordinary lines distinct. They feed exclusively on low plants or grasses, and keep themselves hidden during the day under stones. The pupæ are smooth, shining, and cylindriconic, and are enclosed in cocoons of earth, of a slight consistence, but at a considerable depth underground. The perfect insects are amongst the most powerful fliers in the order.

SPECIES 1.—TRIPHÆNA PRONUBA. PLATE XXI., FIG. 1, 2, 3, 11.

SYNONYMES.—*Phal. Noct. pronuba*, Linnæus; Donovan, vol. 9, pl. 311; Hübner; Noct., pl. 22, fig. 103; Wilkes, 2, pl. 1; Harris, Aurelian, pl. 39, fig. d—f; Wood, Ind. Ent., pl. 8, fig. 112.

Variety.—Triphæna innuba, Ochsenheimer; Treitschke; Esper; Wood, Ind. Ent., pl. 8, fig. 113; Albin, pl. 72, fig. a—d.

This very common species measures from 2 to 2½ inches in the expanse of the fore wings, which vary very much in colour, being of a stone-grey or buff, varying to dark brown, and considerably clouded with small dark transverse freckles, a small circle near, and a dark margined ear-shaped spot beyond, the middle; a somewhat darker waved band near the tip, terminating in a small dark patch on the costa and the apex with a series of small dark arched patches. The hind wings bright orange, with a submarginal black fascia. The head and front of the thorax are ordinarily pale stone colour, but sometimes they, as well as the wings, are of a uniform dark liver-brown. Such specimens have been described as a distinct species, under the name of Innuba, but all the best modern writers consider them only as a variety of Tr. Pronuba. The perfect insect appears in June and July, frequenting meadows and gardens. The caterpillar is of a greenish-brown colour, with two rows of black dots down the back. It feeds, according to M. Guénée, on the roots of various plants, half burying itself in the stems, a circumstance not observed in any of the other species of the genus.

SPECIES 2.—TRIPHÆNA ORBONA. PLATE XXI., FIG. 4, 12.

SYNONYMES.—*Noctua orbona*, Fabr.; Godart; Haworth; Donovan; vol. 10, pl. 343, fig. 2.
Noctua Comes, Oschsenheimer; Treitschke.
Noctua subsequa, Esper.
Noctua pronuba, De Villars.
Varieties.—Noctua prosequa, *Dahl.*; N. adsequa, *Dahl.*; N. connuba, *Hübn.*

This species differs from the preceding in the shape of the fore wings, which are much shorter and comparatively broader, and which vary from 1½ to 1¾ inch in expanse. They are of a pale liver-brown, with several undulated rows of dots, especially marked on the costa, and with a small oval, and a rather large ear-shaped brown stigma (beneath which Mr. Curtis represents another dark stigma, which may be accidental); near the apex there is a darker undulated band. The hind wings are orange, with a black subapical band broadest at the outer angle, and a dark discoidal crescent. The caterpillar is very variable in its colours, with two rows of black spots on the side. It feeds on Plantago lanceolata, etc. The moth is very common, and appears in June and July.

SPECIES 3.—TRIPHÆNA SUBSEQUA. PLATE XXI., FIG. 5.

SYNONYMES.—*Noctua subsequa*, Wien. Verz.; Hübner; Ochsenh.; Godart; Treitschke; Boisduval; Wood, Ind. Ent., pl. 8, fig. 111.
Noctua consequa, Hübner; Curtis, Brit. Ent., pl. 348.

This species very much resembles the preceding in the shape of the broad fore wings, which are brown, with two pale streaks towards the base; an oblique-oval and ear-shaped stigma with pale margins, beyond which are two pale waved streaks, the veins between which are pale and dotted; the apical margin also dotted. The hind wings with the submarginal band broader than in Orbona, and reaching to the centre, where it forms a dark lunule; the superior margin beneath is black, and not rosy, as in that species. A specimen of this insect was taken by Mr. Curtis in the Isle of Bute, on the 27th July, 1825, having been disturbed out of heath, which covers the hills.

SPECIES 4.—TRIPHÆNA FIMBRIA. PLATE XXI., FIG. 6, 7, 13.

SYNONYMES.—*Phalæna Noct. fimbria*, Linn.; Donovan, 6, pl. 208; Hübner, Noct., pl. 22, fig. 102; Harris, pl. 5, fig. 2; Wood, Ind. Ent., pl. 8, fig. 114. *Noctua Solani*, Fabricius.

This fine species varies from 2 to 2¼ inches in the expansion of the fore wings, which vary from a pale grey-stone colour to a dark brown, with two streaks between the base and middle; the two ordinary stigmata varying

in size, succeeded by two pale sinuated streaks, the outer one more or less parallel with the apex, with several whitish dots on the costa. The hind wings rich orange, with a very broad subapical bar of black; the head and thorax are coloured like the fore wings, and the abdomen fulvous. The caterpillar is very thick and fleshy, and is found in the spring and autumn feeding on primrose, violet, potato, etc. It is ochre-brown, with the head darker, two rows of small dusky spots down the back, and the region of the spiracles dark. This is a rare but widely-dispersed species, being occasionally beaten out of oaks in woods. It appears in June, July, and August.

SPECIES 5.—TRIPHÆNA INTERJECTA. PLATE XXI., FIG. 8.

SYNONYMES.—*Noctua interjecta*, Hübner, Noct., pl. 23, fig. 107; Ochsenheimer; Godart, pl. 59, fig. 1; Treitschke; Wood, Ind. Ent., pl. 8, fig. 115.

This species varies from $1\frac{1}{6}$ to nearly $1\frac{1}{2}$ inch in the expanse of the fore wings, which are of a red-brown colour, with a considerable number of sinuated rows of dark marks, and with two black dotted streaks near the apex (the space between which is darker) beyond the ordinary stigmata, which are almost obliterated. The hind wings dull orange-coloured, dusky at the base, and with a broad black subapical fascia. It is not a common species, occurring in the woods of the metropolitan district in June and July. The caterpillar has the conspicuous markings on the eleventh segment obliterated.

SPECIES 6.—TRIPHÆNA JANTHINA. PLATE XXI., FIG. 9.

SYNONYMES.—*Noctua Janthina*, Wiener Verz.; Fabricius; Haworth; Hübner; Esper; Godart; Donovan, vol. 10, pl. 343, fig. 1; Wood, Ind. Ent., pl. 1, fig. 116.

Noctua fimbria minor, De Vill., Ent., pl. 5, fig. 24.

Phal. Domuduca, Fuessly, Arch., pl. 16.

This species varies from $1\frac{5}{12}$ to $1\frac{2}{3}$ inch in the expanse of the fore wings, which are of a fine brown-grey colour, with a slate-coloured gloss in various parts; several darker curved lines near the base, obliterated on the disc; a broader curved bar across the centre, and a slender one nearer the apex, terminated on the costa in a triangular red-brown patch. The hind wings bright orange, with the base brown, and a broad subapical black band, much waved, within. The head and front of the body very pale buff; the apex of the fore wings beneath, and the costa of the hind wings pale dull red. This is by no means a common species, although very widely distributed throughout England; it frequents lanes and the margins of woods, and flies in July and August. The caterpillar is dirty-white coloured, with waved dusky stripes on the sides, and strongly-marked cuneiform spots on the eleventh segment; it feeds on Arum maculatum and a species of chickweed.

CERIGO, STEPHENS.

This genus in its preparatory states, as well as in the dark banded hind wings, agrees with Triphæna; it also agrees with that genus in its habits. It has accordingly been separated by Mr. Stephens from the genus Polia, in which Ochsenheimer placed it, and his genus has been adopted by the more recent French Lepidopterists. The antennæ of the males are ciliated nearly to the tips, and the palpi compressed with nearly equal-sized joints; the thorax is slightly tufted behind; the abdomen square at the tip in the males, but conical in the females; the upper wings rounded and denticulated at the tip, with the apex obtuse.

SPECIES 1.—CERIGO CYTHEREA. PLATE XXI., FIG. 10

SYNONYMES.—*Noctua Cytherea*, Fabricius; Haworth; Boisduval; Guénée.

Noctua connexa, Hübner.

Noctua texta, Esper; Stephens; Wood, Ind. Ent., pl. 8, fig. 117.

Phalæna matura, Hufnagle.

♀ *Noctua prospicua*, Haworth, but not of Hübner, which Boisduval refers to the Hadenidi.

This rare species measures from $1\frac{1}{2}$ to $1\frac{3}{4}$ inch in the expanse of the fore wings, which are of an ashy-brown

colour with pale buff or rosy purplish tints, with numerous flexuous whitish streaks across the wings, bordered with black, forming dots on the veins, and with a row of apical dusky spots; the stigmata are large, distinct, and dusky, with pale margins, with a third stigma indicated by two black streaks behind the former. The hinds wings pale straw-colour, with a broad dusky margin narrowed towards the anal angle, and with several small pale arched dots along the edge. The caterpillar is whitish-grey, with a dark line down the back. It feeds on low plants and grasses, as well as on the goat's-beard in the autumn and spring, and the moth appears in June and July.

DESCRIPTION OF PLATE XXII.

INSECTS.—Fig. 1. Lytæa umbrosa (the six-striped Rustic).
" Fig. 2. Lytæa leucographa.
" Fig. 3. Lytæa albimacula.
" Fig. 4. Charæas Cespitis. 5. The Caterpillar.
" Fig. 6. Charæas fusca (the barred feathered Rustic).
" Fig. 7. Charæas nigra (the black Rustic).
" Fig. 8. Cerapteryx Graminis (the antler moth).
" Fig. 9. Rusina ferruginea (the brown feathered Rustic).

PLANTS.—Fig. 10. Avena fatua (wild Oat-grass).
" Fig. 11. Briza media (common Quaking-grass).

Lytæa umbrosa, R. ferruginea, and C. Graminis are from specimens for which I am indebted to Mr. H. Doubleday. L. leucographa, L. albimacula, L. nigra, and C. fusca are from the cabinet of Mr. Stephens. C. Cespitis is from the British Museum, and its larva from Hübner. The female of C. Graminis is sometimes much larger and more clouded in its markings, which formerly led some to suppose it another species—but I have thought it too well known now to require a figure. H. N. H.

LYTÆA, STEPHENS. (NOCTUA P. BOISDUVAL, GUENÉE.)

The antennæ in this genus are robust and serrated and ciliated in the males, but simple in the females, the thorax is short, and the abdomen short, slender, and tufted; the wings round at the base and glossy; the basal joints of the palpi clothed with long loose scales exposing the apical joint; the under wings have a light, central, transverse streak, a central spot, and a broad, rather darkened apical margin.

SPECIES 1.—LYTÆA UMBROSA. PLATE XXII., FIG. 1.

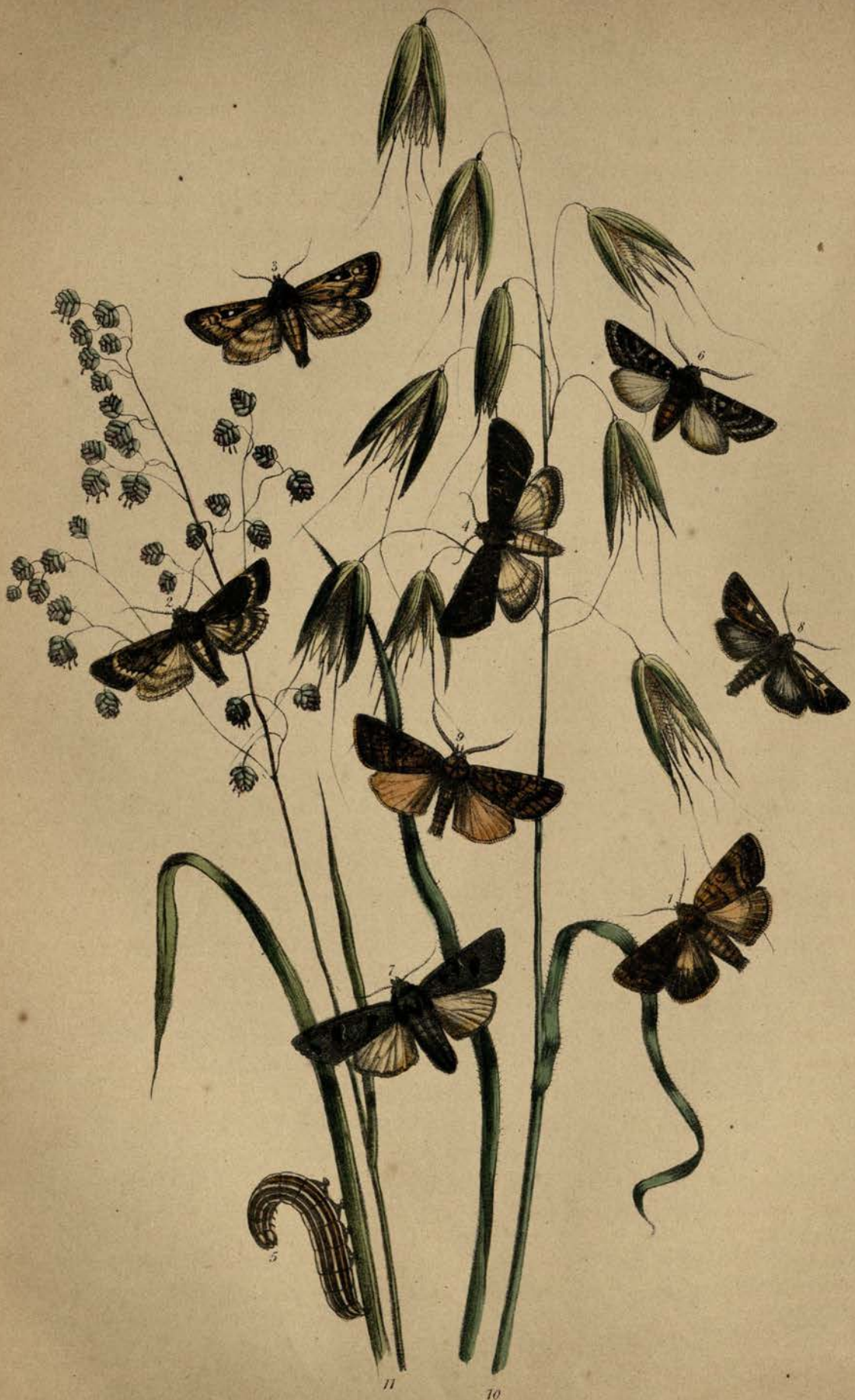
SYNONYMES.—*Noctua umbrosa*, Hübner; Treitschke; Godart; Boisduval; Guénée (Noctua u.); Stephens (Lytæa u.); Wood, Ind. Ent., pl. 8, fig. 118.
Noctua sexstrigata, Haworth.

This species measures from $1\frac{1}{3}$ to $1\frac{2}{3}$ inch in the expansion of the fore wings, which, as well as the head and thorax, are of a red-brown colour, the former with three slender, dark, undulated streaks between the base and the two stigmata, which are separated from each other by an ill-defined brown bar, and are followed by a slender dark, curved line, then a brown cloud, and a slender apical dark streak; the abdomen and hind wings are pale red-brown and shining, the latter with a slender dark stripe below the middle, and a broad, ill-defined, brown margin. It is rather rare, although widely distributed, occurring in July and August. The caterpillar is greyish-white, with a dusky stripe on each side above.

SPECIES 2.—LYTÆA LEUCOGRAPHA. PLATE XXII., FIG. 2.

SYNONYMES.—*Noctua leucographa*, Hübner; Stephens; Ill. 2, p. 199; Treitschke; Boisduval; Guénée; Wood, Ind. Ent., pl. 8, fig. 119.
Noctua lidia, Hübner? Treitschke; Boisduval.
Agrotis agathina, Curtis, MSS.

This species measures $1\frac{1}{2}$ inch in the expanse of the fore wings, which are of a pale brown colour, varied on the costa with pale buff, and on the hind part of the disc with reddish; near the base are two dark streaks,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the second almost indistinct, a third streak behind the outer stigma is much bent, and united by a slight hook with the second stigma; the space between the very pale stigmata is dark; near the apical margin is a pale broadish stripe, bearing a row of dark triangular spots, and a few black ill-defined dots on the margin itself; the hind wings ochreous-brown, with a dark central lunule and two dusky bars. Mr. Stephens's specimen of this very rare insect was taken near York. The caterpillar is green, with white and brown spots.

SPECIES 3.—LYTÆA ALBIMACULA. Plate XXII., Fig. 3.

Synonyme.—*Graphiphora albimacula*, Stephens, Ill. H. 2, pl. 19, fig. 3; and App. p. 199 (Lytæa alb.)

This species measures about 1½ inch in the expanse of the fore wings, which are shining brown, "beautifully shaded with rich purple, with a pale reddish patch at the base, towards the costa; a black streak at the base, with a subocellated purplish spot between its tip and the inner margin, having an ovate black stigmatiform mark adjoining; on the disc is an elongate fuscous black patch, acute anteriorly, and truncate posteriorly; in this the anterior stigma, which is round and white, is placed, and the posterior one at the hinder extremity; the ordinary strigæ are rather obsolete, but in the places of the usual hinder ones is a series of fuscous dots, united by an uninterrupted black longitudinal streak to the reniform stigma; posterior wings dusky-ash and glossy, with a faint transverse striga, and darker border." Taken at Whittlesea Mere, and at Ringwood, Hants, in the autumn.

CHARÆAS, Stephens. (LUPERINA and HADENA, p. Boisduval, Guenée.)

The antennæ in the males of the species, here associated together, are more or less pectinated, whilst they are simple in the females; the palpi are very short, with the second joint gradually attenuated, and the apical joint rather elongated and exposed, the thorax not crested; the abdomen is terminated in the males by a tuft; the wings are generally somewhat toothed along the apical margin, the posterior pair being darker in the females than in the males. The larvæ are naked, and feed on the roots of plants; they are thick and subvermiform, with dark longitudinal stripes, and the pupa state is passed underground.

* WINGS RATHER BROADER AND LESS DENTICULATED (LUPERINA P. BOISDUVAL).

SPECIES 1.—CHARÆAS CESPITIS. Plate XXII., Fig. 4, 5.

Synonymes.—*Noctua cespitis*, Wien. Verz.; Fabricius; Hübner; Curtis (Agrotis C.); Stephens; Wood, Ind. Ent., pl. 8, fig. 120; Boisduval (Luperina C.) *Noctua Hordei*, Schrank.

The expansion of the fore wings of this species varies from 1½ to nearly 1⅔ inch. They are of a blackish-brown colour, with a short basal ashy-coloured streak, behind which is a whitish somewhat transverse one, edged with black; another similar one but more curved is placed beyond the outer stigma, which, as well as the inner one, is edged with a pale line, beyond which is a pale waved streak, with a row of apical dark dots and several whitish costal spots; the hind wings in the male are whitish-grey, but ashy-brown in the female, with an ill-defined row of dusky spots across the centre, and a dusky border. The caterpillar is dark brown, with several pale longitudinal stripes on each side. Found in lanes in Kent, in September. Mr. Stephens, in his Catalogue, regarded as a doubtful variety of this species a unique specimen obtained from the Marshamian Collection, which in his Illustrations he described as distinct under the name of Charæas confinis, and which differs from the foregoing in the "paler colour and narrowness of the fore wings, nearly uniformly-coloured hind wings, and slightly pectinated antennæ."

** WINGS NARROWER AND MORE DENTICULATED (HADENA P. BOISDUVAL).

SPECIES 2.—CHARÆAS FUSCA. PLATE XXII., FIG. 6.

SYNONYMES.—*Noctua fusca*, Haworth; Curtis (Agrotis f.); Stephens (Charæas f.); Wood, Ind. Ent., pl. 8, fig. 122.
Noctua lutulenta? W. V.; Hübner; Treitschke; Boisd. (Hadena l.)
Varieties.—Charæas consimilis and orthostigma, *Stephens*, Cat. Haust., p. 64.

The fore wings in this species vary from $1\frac{1}{3}$ to nearly $1\frac{2}{3}$ inch in expanse, and are of a dark brown colour, inclining to black, with a subtriangular, central, dark fascia, attenuated behind, and bordered with a narrow pale streak, and a somewhat obsolete paler streak near the apical margin; the stigmata are very obscure, and placed on the dark fascia, behind which is a waved ashy or grey streak and several white spots on the costa; the hind wings are clear white in the male, but dusky in the females, with a darker border; varieties have occurred with the fore wings of a nearly uniform dark colour, and others with the stigmata distinct and yellowish. All the specimens were taken near Birchwood, Kent, in September.

SPECIES 3.—CHARÆAS NIGRA. PLATE XXII., FIG. 7.

SYNONYMES.—*Noctua nigra*, Haworth; Curtis; Stephens, Ill. 2, p. 110.
Noctua Æthiops, Ochsenh.; Hübner, Noct., fig. 538; Stephens, Ill. 2, pl. 20, fig. 2.
Noctua nigricans, Hübner, olim.
Hadena Æthiops, Boisduval; Guénée.

This species measures about $1\frac{3}{4}$ inch in the expanse of the fore wings, which are of a dull black colour, tinged with reddish before and beyond the middle, with a broad, somewhat triangular darker bar in the middle; the stigmata are nearly obliterated, the posterior one having an interrupted outer edging of yellowish; in this dark fascia, towards the inner margin, is a darker longitudinal stripe; on the costa, towards the apex, are several whitish dots, and along the apical margin, which is denticulated, are several dull yellowish spots, preceded by small dark patches; the abdomen is pale brown, lighter at the base; the hind wings whitish in the male, but dusky ash in the female, with a dusky border. They are strongly denticulated. The abdomen of the male is terminated by a bifid tuft. This very rare species has been found, in June, in Kent, Cumberland, and Devonshire.

CERAPTERYX, CURTIS. HELIOPHOBUS, P. BOISDUVAL.

The head is small and the thorax not crested; the abdomen tufted in the males at the tip but conical in the females; the wings are not denticulated; the palpi are moderate in size; the terminal joint about half the size of the preceding, and exposed, and the antennæ are bipectinated in the males, the rays being ciliated, with the terminal joints simple; the female antennæ are slightly pubescent on the inside. The larva is naked, with sixteen feet; it is of a brown colour, with pale stripes down the back and sides, and feeds on various grasses, but not upon Alopecurus pratensis nor Trifolium pratense, according to Linnæus, by whom, as well as by various subsequent writers, the great injury committed by the larvæ in grass lands have been described.

SPECIES 1.—CERAPTERYX GRAMINIS. PLATE XXII., FIG. 8.

SYNONYMES.—*Phal. Bombyx graminis*, Linnæus; Donovan, vol. 13, pl. 458; Hübner, Noct., fig. 480, 481; Harris Exposition, pl. 5, fig. 7; Wood, Ind. Ent., pl. 8, fig. 124.
Noctua tricuspis, Hübner, olim; Esper.
Charæas graminis, Guênée.
Variety.—Cerapteryx hibernicus, Curtis, Brit. Ent., pl. 451.

This species varies from $1\frac{1}{6}$ to $1\frac{1}{2}$ inch in the expansion of the fore wings, which, as well as the head and thorax, are very variable in colour, but generally grey-brown, with a slender whitish line running from the base along the great median vein, and branching in the same manner as it branches; the space between this pale line and the

costa is darker brown, and bears an oval and an oblong stigma; and there is also a pale oblong oval patch behind the first stigma, towards the inner margin of the wing. Within the apical margin is a series of cuneated black spots; the hind wings are brown, darkest at the apex. Varieties occur with the fore wings of a uniform colour, except the pale yellow marks and stigmata, and others have the latter markings edged with black on a plain ground.

The moth appears in July and August, occasionally in great numbers in certain districts; indeed it is recorded that in Sweden, towards the middle of the last century, the ravages of its larvæ were so extensive, that whole meadows appeared white and dry—as though a fire had passed over them. In some parts of England, "spots of a mile square have been observed totally covered by them, and the grass devoured to the root; and Mr. Wailes has recorded in the Entomological Magazine that in one year at least fifty acres of grass upon Skiddaw were so completely devastated, and the line of devastation so clearly marked, that even from the town of Keswick the progress of the larvæ down the mountain could be distinctly noticed. Vast quantities of rooks flocked to the spot to feed upon the delicious repast afforded by these caterpillars; but so greatly was the vegetation destroyed, that even several years afterwards the extent of their ravages was distinctly visible." "Of course," adds Mr. Wailes, "the quality of the newly grown herbage was materially improved, thus affording another instance of indirect advantages derived from insects." The insect seems to frequent mountain districts by preference, as I have taken it both on the Wrekin, in Shropshire, and on Snowdon, in Wales; and, contrary to the general habits of the family, I noticed it flying with great velocity in the middle of the day. Mr. Wailes, however, mentions that it is about eight o'clock in the morning that they chiefly fly, as he observed them at that time flying in swarms over old pastures; but on returning to the spot a couple of hours afterwards, with his butterfly-net, not one was to be seen. The next morning he was early on the spot, but then, also, not a solitary moth was to be seen; at half-past seven he was about to return, "when suddenly the whole field, as far as the eye could reach, was once more the scene of their gambols; the eye became bewildered with their motions; they were lost in the mazes of their evolutions. Sudden, however as their appearance had been, their disappearance was equally so, as, with one general consent, at about half-past eight, they again settled, and their flight for the morning being over, scarce a solitary specimen was anywhere to be seen. They flew about three or four inches from the ground, and apparently very seldom alighted, but threaded their way most dexterously amongst the long culms of the grasses."

RUSINA, Stephens, Boisduval, Guénée.

The antennæ in the males are strongly pectinated, but ciliated in the females; the palpi are slender, and extend beyond the forehead, they are compressed and rather bent upwards; the thorax is not crested; the abdomen scarcely extends beyond the hind wings; the fore wings are rather obtuse at the tip, shining, with the two middle lines distinct, as well as the reniform stigma. The caterpillar has sixteen feet; it is attenuated at each end, with longitudinal stripes; it feeds on a variety of low herbs, and keeps itself concealed by day. The chrysalis is smooth, shining, cylindric-conic, enclosed in a slight cocoon of earth. In various respects this genus comes very near to Caradrina. It is of difficult location, being arranged by Boisduval in his Amphipyrides, and by Guénée in his Noctuelidi.

SPECIES 1.—RUSINA FERRUGINEA. Plate XXII., Fig. 9.

Synonymes.—*Bombyx ferruginea*, Esper; Stephens, Ill. (Rusina f.)
Noctua tenebrosa, Hübner; Boisduval; Guénée (Rusina t.)
Noctua phœa, Haworth.
Noctua obsoletissima, Haworth (variety).
Noctua nigricans, Hübner?? (referred by Boisduval and Guénée to Charæas Æthiops, Ochs.—nigra, Haworth—).

This species measures rather more than 1½ inch in the expansion of the fore wings, which are of a reddish-

grey colour, with two obscure dusky spots near the base, and with a curved dusky streak before, another between, and a third beyond the stigmata, which are obscure; the subapical bar is very much waved, and bordered next the margin with paler grey. These stripes terminate on the costa in pale marks, and are succeeded by several whitish dots; the hind wings are paler, with a slight dusky marginal bar. The caterpillar is dusky brown, with the head pale, and various pale, longitudinal, dorsal and lateral stripes. The perfect insect has been found near Darenth, in June, by Mr. Stephens, and on Wimbledon Common, in July, by Mr. Douglas.

AGROTIS, Ochsenheimer.

This is one of the most difficult of all the groups of Noctuidæ, the species not only being subject to great variation in colour and marking, so that they have been greatly confused, but likewise presenting such striking variations in structure, as to render it difficult to form satisfactory generic characters. The palpi extend slightly beyond the head, and are straight or but little elevated; the apical joint small and oval, when denuded, distinctly visible; the scales terminating in a truncated manner at the tip. The antennæ are long, and often bipectinated in the males, the pectinations often not extending to the tip; in other species they are only thickened, and producing fascicles of hair beneath; in the females they are simple, and pubescent on the under side. The frontal tuft is thick, and exhibits several depressions; the thorax is robust and square, with the neck and tippets generally elevated; the abdomen is rather depressed and not crested; the fore wings are obtuse at the tip, and with the apical margin entire; when at rest they are carried horizontally on the back; they are often ornamented with three stigmata; the hind wings are rounded and entire, and often shining.

The caterpillars are fleshy grubs of a livid colour, and of a subverniform appearance, but little attenuated at each extremity, with numerous small, black, verrucose points; but rarely marked with stripes, and furnished with a horny plate on the neck; they feed on the roots and leaves of low herbage, hiding themselves by day either under stones, etc., or in holes which they form for themselves. The chrysalides are shining, cylindric-conic; they undergo their transformations in the earth, in a very slightly-formed cocoon. Some of the species are very destructive to various culinary vegetables, perforating the roots, especially those of lettuce, turnips, as well as corn and grasses.

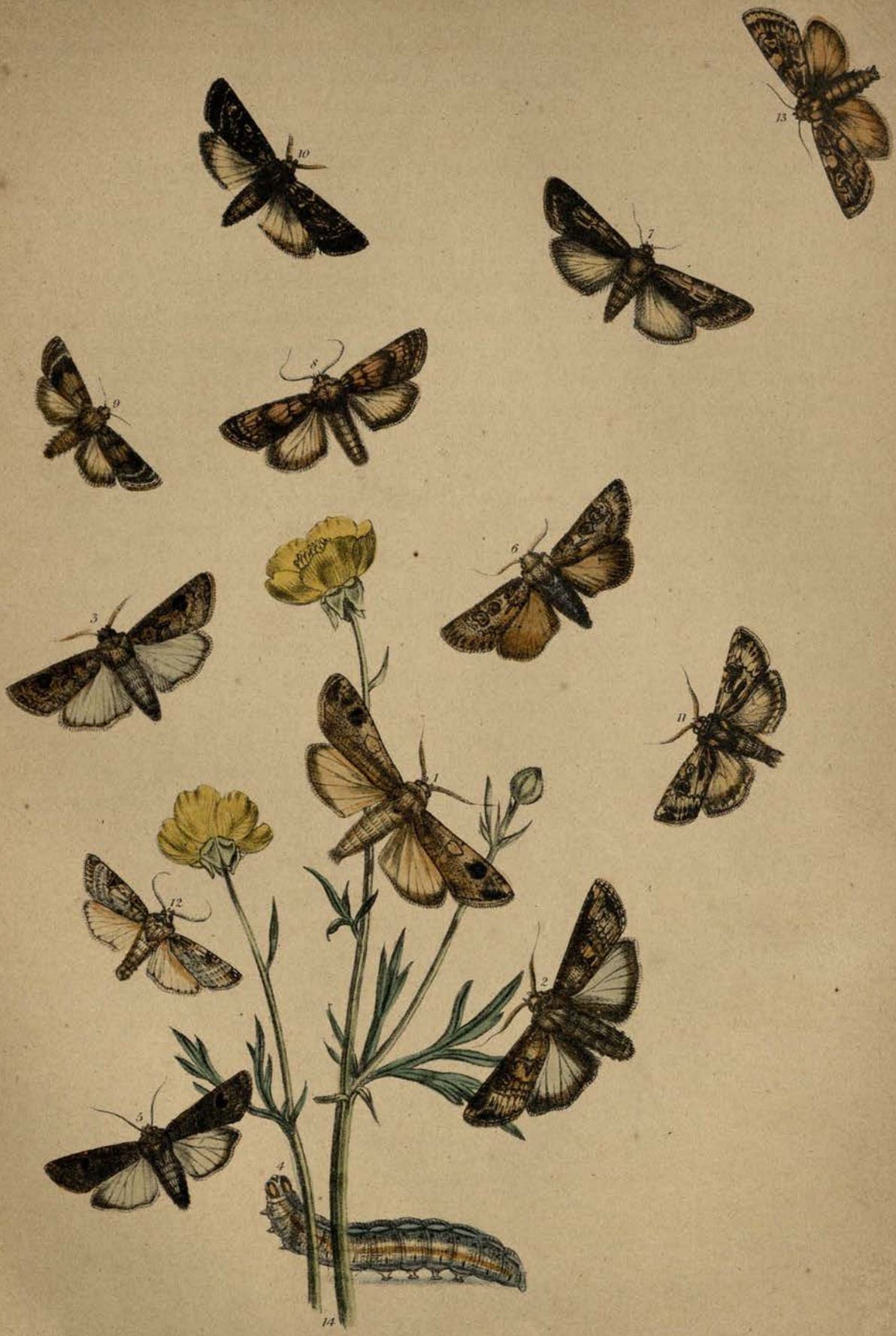
Section 1.—Antennæ more or less strongly pectinated in the males.

DESCRIPTION OF PLATE XXIII.

Insects.—Fig. 1. Agrotis æqua (the pearly underwing).
" Fig. 2. Agrotis suffusa (the dark sword-grass).
" Fig. 3. Agrotis segetum (the common dart). 4. The Caterpillar. 5. A dark female variety.
" Fig. 6. Agrotis corticea (the heart and club).
" Fig. 7. Agrotis annexa, a female (the tawny shoulder).
" Fig. 8. Agrotis cinerea, male (the light-feathered rustic). 9. The female.
" Fig. 10. Agrotis lunigera.
" Fig. 11. Agrotis valligera (the Archer's dart).
" Fig. 12. Agrotis radiola (the shuttle-shaped dart).
" Fig. 13. Agrotis alpina.
Plant.—Fig. 14. Ranunculus bulbosus (the common Crowfoot or Buttercup).

The whole of the genus Agrotis is comprised in Plates 23 and 24, the present plate containing all those which have the antennæ of the males pectinated; and the following all those where the antennæ are only ciliated.

A. æqua and A. radiola are from specimens in the British Museum. A. segetum and A. valligera are from specimens sent me by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Mr. Doubleday; and the remainder are entirely from the cabinet of Mr. Bentley, with the exception of A. alpina, a unique specimen, which was kindly lent me by Mr. Douglas for the purpose of figuring it in this work. The caterpillar of segetum is from Hübner. I regret very much being able to figure so few of the caterpillars of this group, as they have been so little studied that scarcely anything is known respecting them. I call upon the numerous subscribers to this work, who have opportunities of collecting, to send me any caterpillars they may discover of Noctuæ, particularly underground feeders, and they shall be carefully figured and described. H. N. H.

SPECIES 1.—AGROTIS LUNIGERA. Plate XXIII., Fig. 10.

Synonymes.—*Agrotis lunigera*, Stephens, Ill. Haust., 2, p. 113, pl. 20, fig. 3.

This species measures 1⅞ inch in the expansion of the fore wings, which are described by Mr. Stephens as of a rich fuscous varied with yellowish, with an angulated black streak at the base united to an abbreviated pale striga; behind this, at a distance from the anterior stigma, is a tranverse yellowish waved striga, bordered on each side with dusky, and very much angulated towards the inner margin; a similar striga arises from the costa opposite to the posterior stigma, and bending outwards, turns rather suddenly towards the inner edge, the space between the arch and the stigma being yellowish, or dull ochraceous brown; near the hinder margin is a pale waved streak, and the margin itself is spotted with black, with a pale griseous line at the base of the cilia; the anterior stigma is dusky towards the costa, and bright flavescent towards the inner margin of the wing, forming a lunule of the latter colour; the posterior stigma is margined anteriorly with black and flavescent, and posteriorly with black; the hind wings creamy white. Very rare. Found in June, near Cork, in Ireland.

SPECIES 2.—AGROTIS CORTICEA. Plate XXIII., Fig. 6.

Synonymes.—*Noctua corticea*, Hübner; Ochsenheimer; Stephens; Boisduval; Guénée (A. c.)
(Male) *Noctua clavigera*, Haworth.
Bombyx exclamationis, Esper.
(Female) *Noctua sordida*, Hübner.
Noctua subfusca, Haworth.

This species measures from 1⅓ to 1⅔ inch in the expansion of the fore wings, which, as well as the body, are nearly of a uniform brown colour slightly freckled with rather pale ashy, with the costa rather darker; near the base are two slender, waved, dark streaks, the second much more distinct; the two stigmata are very distinct and nearly black, with a short longitudinal black bar behind the basal one; a much-curved streak follows the second stigma, and the extreme margin is dark; the hind wings are dusky ash with a central curve, and the hind margin darker. There are numerous varieties not only in the ground colour of the wings, but also in the distinctness as well as the size of the markings.

It appears to be widely distributed throughout England, but is not a common insect.

SPECIES 3.—AGROTIS ÆQUA. Plate XXIII., Fig. 1.

Synonymes.—*Noctua æqua*, Hübner; Ochsenheimer.
Noctua saucia, Hübner; Boisduval; Guénée.
Noctua margaritosa, Haworth.
Var.?—Noctua majuscula, Haworth.

This species measures about 2 inches in the expanse of the fore wings, which are of an ashy stone colour, with delicate darker cloudings, and with several black dots along the costæ; the two ordinary curved stripes next the base of the wing are very slight and almost indistinct; the anterior stigma is large, pale, and almost indistinct, bounded by a dark ring; the second stigma is also large and rather dusky, followed by a small dark cloud towards the apex of the wing, where is a paler patch, and a larger dusky one next the margin, which is marked with a row of black dots; the hind wings are dusky white, with the margin darker.

Found in the autumn near London, but very rare; Mr. H. Doubleday found several near Epping, in 1827, and again in October, 1841. It is a very distinct and not very variable species.

The supposed variety named majuscula by Haworth differs in the very dark pitchy-black colour of the fore

wings, and the darker margin to the hind wings. Two females were taken in Kent, in September, 1840, agreeing with this species, but not with æqua; so that more information is required before the identity of the species can be admitted.

SPECIES 4.—AGROTIS SEGETUM. PLATE XXIII., FIG. 3, 4, 5.

SYNONYMES.—*Noctua segetum*, Wien. Verz.; Ochsenheimer (vol. 5, p. 155); Hübner.
Noctua segetis, Fabricius; Hübner; Stewart; Vieweg.
Bombyx caliginosa, Esper.
Varieties.—Bombyx fuscosa, Esper.
Bombyx corticus, Haworth.
Bombyx connexus, Haworth.
Bombyx venosus, Haworth.
Bombyx spinulus, Haworth.
Bombyx nigricornutus, Haworth.
Bombyx monileus, Haworth.
Bombyx subatratus, Haworth.
Bombyx pectinatus, Haworth.
Bombyx catenatus, Haworth.
Agrotis affinis, Stephens, MSS. olim.

This most variable insect measures from $1\frac{1}{2}$ to nearly 2 inches in the expanse of the fore wings, which are of a brown colour, very inconstant in its hue, sometimes nearly black, and considerably irrorated with darker shades; near the base of the wing are several indistinct, irregular, darker fasciæ, one of which runs more distinctly across the wing at the base of the spear-shaped stigma; the basal stigma is oval and rather small, circled with a dark line; the ear-shaped one is large and dusky, and followed by a double undulated fascia across the wing, and the margin is marked with a row of small semi-oval black spots: the position, form, and development of the fascia, beyond the posterior stigma, is very variable, the varieties arising therefrom having been regarded as distinct species; as have also numerous others, produced by the general colour of the wings, the greater or less distinctness of the fasciæ and stigmata, etc. The female (fig. 5) is darker than the male, and both sexes have the hind wings nearly white with a purplish tint, and with the hind margin and veins dusky, especially in the female.

The moth is extremely common, and appears in June. The caterpillar is often extremely destructive to young wheat, of which it devours the roots in the autumn and spring; it is of a dirty brown colour, with a pale dorsal and lateral line, the latter with a reddish tinge and black dots. Mr. H. Doubleday also informs us that it is very troublesome in gardens, often destroying anemones, etc., and eating into the roots of dahlias, etc. It is also the larva of this or one of the closely allied species which often injures the turnip crops in the autumn to a very great extent, in different parts of the country.

SPECIES 5.—AGROTIS SUFFUSA. PLATE XXIII., FIG. 2.

SYNONYMES.—*Noctua suffusa*, Wien. Verz.; Ochsenheimer; Fabricius; Haworth; Wood, Ind. Ent., pl. 9, fig. 130.
Bombyx spinula, Esper; Donovan, vol. 10, pl. 345, fig. 2, 3.
Noctua Upsilon, Hufnagle.
Bombyx spinifera, De Vill; Haworth.

This species measures from $1\frac{3}{4}$ to 2 inches in the expanse of the fore wings, which are of a light buffish-brown, with the costal portion much darker, and marked with several whitish specks; near the base are several indistinct dusky waves, followed by a double, dark, very much waved line, united with the very small teliform stigma; the basal stigma is small and pointed behind, dusky in the middle, and edged with a dark line; the second stigma is large, but almost confounded with the dusky costal patch, which here extends nearly across the wings; this stigma is followed by a short, slender, clear, black streak, pointed at the tip, behind which is a double, nearly straight, wavy fascia; the succeeding space pale, but marked opposite the stigma with two other short, black, acute, longitudinal streaks, beyond which is a dusky marginal patch, and behind these a series of acutely angled marks, not very distinct. The hind wings are white, with a purple gloss margined with brown; the frontal crest of the thorax has two brown arches; the wings vary considerably in colour, as well as in the greater or less distinctness of the stigmata and fasciæ.

This moth is found in the woods of Darenth and Birch, Kent, and Epping. Taken very commonly in the latter situation by Mr. H. Doubleday, who informs us that it is double-brooded; the first brood appearing in June, the specimens of which are smaller than those of the second, which appear in September. Mr. Stephens also gives July, and Boisduval and Ochsenheimer July and August, as the times of its appearance. The caterpillar is of an ashy-grey colour, and feeds upon the roots of grasses.

SPECIES 6.—AGROTIS ANNEXA. PLATE XXIII., FIG. 7.

SYNONYMES.—*Agrotis annexa*, Treitschke; Stephens, Ill. Haust., 2, pl. 22, fig. 2; Wood, Ind. Ent., pl. 9, fig. 131.
Noctua subterranea, Haworth (but not of Fabricius).

This very distinct species measures 1⅔ inch in the expansion of the fore wings, which are of a pale brown colour; the fore margin and apex pale, the hind portion of the wing dark, and the stigmata united by a black dash; there are numerous short, transverse, dark shadings across the costal part of the wing, and other irregular ones between the base and the stigmata, beyond which is a row of dark spear-shaped dashes, and a row of dark points along the apical margin of the wing. The hind wings white, with the outer and anal edge brownish, and a slender dusky apical margin. Very few specimens of this very rare species have occurred in the neighbourhood of London (West Ham, Essex), and one specimen near Cork, in June, 1826, now in Mr. Bentley's cabinet, whence, by his permission, our figure was taken. Boisduval omits it from the European species of the genus, considering it to be a native of North America.

SPECIES 7.—AGROTIS VALLIGERA. PLATE XXIII., FIG. 11.

SYNONYMES.—*Noctua valligera*, Wien. Verz.; Treitschke, 5, 163; Fabricius; Stephens; Wood, Ind, Ent., pl. 9, fig. 132.
Bombyx clavis, Esper; Donovan, 10, pl. 340, fig. 2.
Noct. sagittifera, Haworth, but not of Hübner nor Treitschke.
Bomb. trigonalis, Esper.
Ph. Noct. clavifera, De Vill.

This handsome species measures from 1⅓ to 1⅔ inch in the expanse of the fore wings, which are of a pale grey colour, varying to bluish or leaden-grey; the costa with a dark narrow stripe interrupted by several small whitish dots; the basal stigma small, nearly white and oval, with a dark centre and margin, and the ear-shaped stigma large and dark grey-coloured (often followed by a small spine-like black mark), near to the other, the space between them being dark. Behind the first stigma is a large elongate-oval brown patch, separated from it by a whitish streak, and which runs interruptedly to the base of the wing; beyond and behind the hinder stigma is a very slender waved streak, followed by a series of brown, slender, angulated marks, and two or three dusky patches on the margin; the hind wings pale brown, with a slight darker central lunule, a subapical dusky fascia, and a slender dark marginal line; the thorax is varied with grey and brown, the tippets being very pale, and edged with dark brown.

This species is comparatively rare, but very widely distributed. It appears in the perfect state in August.

SPECIES 8.—AGROTIS RADIA. PLATE XXIII., FIG. 12.

SYNONYMES.—*Bombyx radius*, Haworth; Stephens, Ill.
Variety.—Noctua radiola, Haworth MSS.; Curtis; Stephens, Ill. H., 2, plate 20, fig. 1, p. 119.
Noctua picta, Ochs.?
Variety?—N. lignosa, Godart.

This species measures about 1⅓ inch in the expanse of the fore wings, which are pale brown, varying to ashy-grey, with a brown patch near the base, another towards the costa in the region of the second stigma, and the apical margin is also dusky; the costa is marked with a considerable number of small, dark, oblique spots, some of which towards the base are continued in irregular curved and waved lines across the wing, a small spear-like

blackish mark occupying the place of the supplemental stigma; the anterior stigma is sometimes obsolete. Behind the posterior stigma is a double row of blackish dots, and there is a row of small whitish dots along the apical margin of the wing; the hind wings are often whitish, slightly shaded with brown, with a row of marginal dots; they are variable in colour, however, in different specimens.

Mr. Bentley has described a series of varieties of this species in the "Entomologist," proving Mr. Stephens's supposition, that A. radia and radiola were varieties of but one species, to have been correct.

Taken in June in numerous places round London, as well as in various distant parts of the country.

SPECIES 9.—AGROTIS CINEREA. PLATE XXIII., FIG. 8, 9.

SYNONYMES.—*Noctua cinerea*, Hübner; Treitschke; Curtis, Brit. Ent., pl. 165. | *Bombyx denticulatus*, Haworth. (Female) *Noctua obscura*, Hübner.

This very well-marked species measures from $1\frac{1}{3}$ to $1\frac{2}{3}$ inch in the expansion of the fore wings, which are of an ashy colour, shaded slightly with dusky, with a short, angulated, slender, brown fascia near the base, and another still more irregularly angulated before the middle of the wing, with the anterior stigma and the supplemental teliform one obliterated; a little beyond the middle of the wing runs a waved brown bar, followed by the posterior stigma, which is very small, dark coloured, and ear-shaped, and succeeded by a slender, much-waved, dark streak, then a series of obscure patches, and a row of black dots on the apical margin itself; the hind wings buff-white, with a dusky central lunule, and a series of marginal dots; the thorax grey, with a dark bar in front. The antennæ are pectinated in the males. The female is considerably darker in colour, with the streaks darker but less waved, and the hind wings ashy. The want of the two anterior stigmata, as well as the structure of the caterpillar (which is slightly hairy, and of a greenish-brown colour, with reddish dorsal stripes), separate this species from the rest of the genus. It appears to be very widely distributed, although a rare species. We have been favoured with the sight of a beautiful variety taken near Carlisle by T. Reeves, jun., Esq.

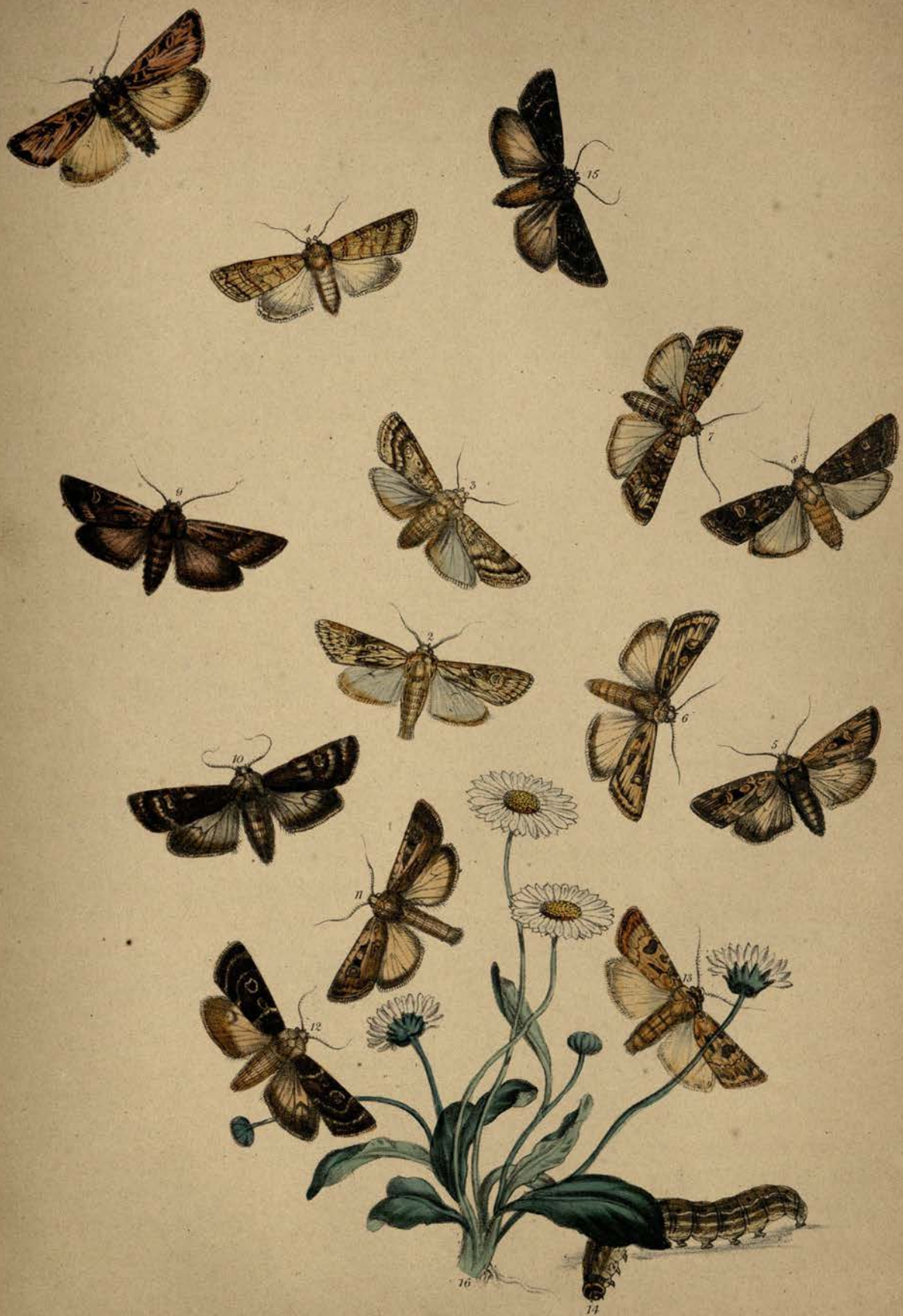
SPECIES 10.—AGROTIS ALPINA. PLATE XXIII., FIG. 13.

This new and distinct species measures $1\frac{1}{2}$ inch in the expanse of the fore wings, which, as well as the body and hind wings, are of a pale buff-coloured grey, the costa of the former marked before and behind the middle as well as near the tip with a dusky spot; there is also a patch of this colour near the base towards the posterior margin, and another more elongated extending to the anterior stigma, which is round and grey-coloured, open in front, and running to the costa; this is succeeded by a small dark patch, and this by the second stigma, which is rather broad and ear-shaped, dusky within, and edged, as well as the other, with brown: from the outer edge of the second stigma extend three dusky rays, separated by the whitish spaces occupied by the veins of the wing; these rays are cut in the middle by a very much curved series of dusky slender arches, which is followed by a row of triangular dark-coloured patches parallel to the apical margin, which is further marked with minute dusky arched dots; the abdomen and hind wings are of a uniform silky buffish-grey, with the cilia nearly white.

Taken on Cairn Gowr, in Perthshire, at an elevation of three thousand feet, by J. W. Douglas, Esq.; to whom we have to present our thanks for an opportunity of describing and figuring this fine addition to the genus.

The unique specimen captured was a female, so that it is from analogy with some of the preceding species, especially A. suffusa, that I introduce it at the end of the present section of the genus.

SECTION II.—Antennæ of the males not pectinated, producing only fascicles of hairs.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DESCRIPTION OF PLATE XXIV.

INSECTS.—Fig. 1. Agrotis subgothica (the gothic dart).
" Fig. 2. Agrotis pascuea.
" Fig. 3. Agrotis nebulosa, a female.
" Fig. 4. Agrotis cursoria, a female.
" Fig. 5. Agrotis Tritici (the white-line dart). 6. The supposed variety called sagittifera.
" Fig. 7. Agrotis cuneigera (the wedge-barred dart). 8. The Cumberland variety called venosa.
" Fig. 9. Agrotis aquilina.
" Fig. 10. Agrotis nigricans (the garden dart). 11. The variety called obeliscata. 12. The variety called dubia.
" Fig. 13. Agrotis exclamationis (the heart and dart). 14. The Caterpillar.
" Fig. 15. Agrotis Marshallana.
PLANT.—Fig. 16. Bellis perennis (the common Daisy).

A. subgothica is from Mr. Stephens's figure. A. nebulosa is from the British Museum. A. pascuea and fig. 15 are from the cabinet of Mr. Marshall. A. exclamationis from a specimen sent me by Mr. Doubleday; and all the others from the cabinet of Mr. Bentley. The caterpillar of exclamationis is from Hübner. H. N. H.

SPECIES 11.—AGROTIS TRITICI. PLATE XXIV., FIG. 5.

SYNONYMES.—*Phalæna Noct. Tritici*, Linnæus; Godart; Treitschke; Boisduval; Stephens.
Noctua fictilis, Hübner.
Varieties.—Noctua eruta, *Hübner*.
Noctua pratincola, Hübner.
Noctua recussa, Hübner?? (Boisduval gives this as a distinct species).
Noctua albilinea, Haworth.
Variety?—Noctua vitta, Hübner (Boisduval gives this as a var. of aquilina).
Noctua lineolata, Haworth; Stephens (Agr. l.)
Noctua pupillata, Stephens (Agr. p.)
Noctua ocellina, Wien. V.; Hübner, Tr. Steph. (Agr. oc.)
Bombyx phytheuma, Esper.

We have here one of the most difficult, because most inconstant, of all the Noctuidæ, no two specimens being exactly alike, whence so many of the varieties have been regarded as distinct species, as noticed in the synonymes given above. It measures about $1\frac{1}{2}$ inch in the expansion of the fore wings, which in the more typical states are of an ashy-brown, slightly tinged with reddish, the costa marked with several dark dots towards the tip; within the costa is a longitudinal paler streak, running nearly to the tip of the wing; the base itself being also paler, with several very indistinct dusky markings, the ordinary transverse strigæ before and beyond the stigmata being almost obsolete; the two ordinary stigmata are pale, margined with a dark line; the supplemental stigma is dusky, margined with black: there is a row of elongated, dark, wedge-shaped marks nearly along the apical margin, which is darker, and a marginal row of dark dots; the hind wings are whitish, with the margin dusky.

I avail myself of Mr. Bentley's article upon this genus in the "Entomologist" (p. 256), by introducing short descriptions of some of the more striking varieties of this species, which have been regarded as distinct species by various authors; observing only that Mr. Bentley (whose practical knowledge of this difficult group of insects is unequalled in this or any other country) has described numerous other varieties filling up the intervals between the several types mentioned below. The sixth variety described by Mr. Bentley is the N. lineolata of Haworth, which has (perhaps incorrectly) been regarded as the Noctua vitta, of Hübner:—"Anterior wings reddish-brown, with a white streak upon the costa extending from the base beyond the middle; the central nervure of the wings is white, between the stigmata is a quadrate black spot, the teliform stigma small and black; near it is a pale transverse striga; on the posterior margin is a row of wedge-shaped spots and a white waved striga; posterior wings cinereous with dusky margins."

The ninth variety described by Mr. Bentley corresponds with the N. pupillata of Haworth. "Anterior wings brownish, with four transverse strigæ; the first at the base, the second before the anterior stigma, the third behind the posterior, and the fourth near the hinder margin; the costa is spotted with dusky and white, the space between the second and third strigæ rather pale; stigmata pale, anterior ocellated."

The eleventh variety described by Mr. Bentley agrees with the N. ocellina, of Hübner. "Anterior wings dusky or blackish, with a short ashy streak upon the costa, with two black transverse strigæ, the first before the anterior stigma, the second behind the posterior; near the hinder margin is a pale waved striga, anterior stigma ocellated."

Mr. Bentley's twelfth variety, taken near Brockenhurst, in Hampshire, in September, is remarkable for its small size, expanding only 1 inch. The "anterior wings blackish, with a black streak at the base in the centre of the wing, extending beyond the anterior stigma; posterior wings ashy, slightly margined with fuscous."

Mr. Bentley has also informed us that A. sagittifera is probably another variety.

Thus it will be seen that the variation in this species ranges from the possession of from four to no transverse strigæ, from a large to an obsolete teliform stigma, from the possession to the want of a pale stripe upon the costa, and from grey to dark brown-coloured wings, sometimes dark at the base, and sometimes along the apical margin. It is therefore not very surprising that there are not two collections in London in which they are marked alike.

The species is not very uncommon in the southern counties of England, as well as at Whittlesea Mere, in June and July. The caterpillar is grey and shining; it feeds on the roots of grasses and low plants, hiding itself by day.

SPECIES 12.—AGROTIS CUNEIGERA. PLATE XXIV., FIG. 7.

SYNONYMES.—*Agrotis cuneigera*, Stephens, Ill. Haust., 2, p. 123.
Noctua valligera, Haworth.
Variety?—Agrotis venosa, Stephens. (Our plate 24, fig. 8.)
Variety?—Agrotis hortorum, Stephens.

The type of this supposed species measures $1\frac{1}{3}$ inch in the expanse of the fore wings, which are of a reddish-brown colour, with the three stigmata distinct, but with the transverse strigæ rather obscure, and a row of acutely wedge-shaped brown spots within the apical margin. There is also a brown triangular-shaped spot before, and another square in shape between the stigmata; the hind wings are white, with the margin and veins dusky; the female is more griseous in colour, without the brown spots before and between the stigmata; and the hind wings are more dusky. The stigmata are extremely variable in shape; the anterior one varying from nearly triangular to circular.

Found near London in July.

It is with doubt that we give the A. venosa of Stephens as a variety of the preceding insect, from which it differs in being of a more dusky appearance, being much irrorated with dark specks, with the base of the wing considerably varied with dark marks and waves; the supplemental stigma is wanting, the dark spaces near the ordinary stigmata are here visible; a much-waved pale striga runs from the hind part of the posterior stigma, and there is a submarginal undulated striga, preceded by black wedge-shaped marks; the body and hind wings are like A. cuneigera. Taken in Cumberland and near Edinburgh in July.

It is upon the authority of Mr. Bentley that we also give the A. hortorum of Stephens as another variety of A. cuneigera, although Mr. Stephens considered it might prove to be a suffused variety of Tritici. He describes the fore wings as deep dusky-ash, with four transverse paler strigæ, the three anterior of which are edged with dusky, placed nearly as in Tritici; but the posterior one is less undulated, and has a row of elongated dusky or black streaks attached to the anterior edge, as in A. cuneigera; on the hinder margin is a row of minute black spots; the usual stigmata are faintly rufescent, margined with black; the third is very slender, and the black margins alone are visible; the posterior wings are fuscous, with the nervures and margin darker. The body deep fuscous. Taken in August at Whittlesea Mere.

SPECIES 13.—AGROTIS SAGITTIFERA. PLATE XXIV., FIG. 6.

SYNONYME.—*Noctua sagittifera*, Hübner? Treitschke; Stephens, Ill. Haust., 2, 119.

Mr. Stephens is the only author who has noticed this species as British, and as he considered it doubtful whether his specimens were the true sagittifera of Hübner, it will be necessary to quote his description of them; to which we are only able to add, that in the opinion of Mr. Bentley they are but another variety of A. Tritici. He has not, however, introduced them as such in his observations on that species in the "Entomologist" for February last.

Expansion of the fore wings $1\frac{5}{12}$ inch. "Head and thorax griseous, mixed with white; anterior wings griseous, clouded with white, with a longitudinal, black, arrow-shaped line at the base; the anterior stigma is rather elongate, ovate, whitish, with the centre pale ashy-brown; the posterior griseous in the centre, margined with dusky and white; the space between, as well as at the base of the anterior stigma, deep fuscous; the teliform stigma is rather elongate, and has a slender black streak extending from it; on the hinder margin is an angulated pale stripe, having a few dusky wedge-shaped lineolæ within; the margin itself has a row of minute black dots; on the costa, near the apex, is a fuscous spot, in which are three white dots: the posterior wings are whitish, with the margins dusky; the male has the posterior wings milk-white." Taken in the neighbourhood of London.

SPECIES 14.—AGROTIS AQUILINA. PLATE XXIV., FIG. 3.

SYNONYMES.—*Noctua aquilina*, Wien. Verz.; Hübner; Treitschke, 5, p. 134.

Noctua nigro fusca, Esper.

Noctua domestica, Fabricius.

Noctua vitta, Borkhausen.

This supposed species measures nearly $1\frac{1}{2}$ inch in the expansion of the fore wings, which are of an ashy-brown colour, but variable in tone, with the costa narrowly dark and interrupted by several pale dots; the base of the wing is pale and irregularly clouded, with a double waved streak before the basal stigma, almost obliterated towards the costa; the basal stigma is small and pale, preceded by a short black dash, the space between it and the ear-shaped stigma being sometimes dark; the latter is pale, but darker in the middle, and with a dusky margin; the supplemental stigma is dark-coloured, with a black edge; beyond the second stigma the wing is pale, with a row of black dots; a triangular brown spot near the apex, and a rather broad dusky apical margin with a row of minute black dots. The hind wings in the male are whitish, with a slightly dusky border, those of the female being rather darker-coloured. The caterpillar is ashy-brown, with dark dots on the sides, and a reddish head. It is said, by Treitschke, to feed on the ladies' bedstraw in May, and the moth to appear in July. Treitschke distinguishes it with much care from A. vitta, which Boisduval gives as a variety of it. A. vitta is, however, regarded by Mr. Bentley (Entomologist, p. 257) as a variety of A. Tritici, of which protean species, perhaps, A. aquilina may also eventually prove another variety. Found near London, and on the coast, as well as in Glamorganshire.

SPECIES 15.—AGROTIS NIGRICANS. PLATE XXIV., FIG. 10, 11, 12.

SYNONYMES.—*Phal. Noct. nigricans*, Linnæus; Fabricius; View.; Esper; Wood, Ind. Ent., pl. 9, fig. 144; Haworth; Curtis; Stephens.

Noctua fuliginea, Hübner, fig. 602.

Varieties.—Noctua concolor, *Haworth.*

Noctua carbonea, Hübner, fig. 700, 701.

Noctua fumosa, Wien. Verz.; Fabr.; Hübn., f. 153; Treit.; Bdv.; God.; Stephens; Wood, Ind. Ent., pl. 9, fig. 145.

Noctua rubricans, Esper.

Noctua urbina, Poda; God.

Noctua obelisca? Hübner; Boisduval; Wien. Verz.; God.; Treit.

Noctua obeliscata, Haworth; Curtis; Stephens; Wood, Ind. Ent., pl. 9, fig. 146.

Noctua molothina? Esper.

Noctua Villiersii, Guénée.

Varieties?—Noctua ruris, *Treitschke; Hübner; God.; Haworth; Stephens; Wood, Ind. Ent.*, pl. 9, f. 172.

Noctua vitta? Hübner, etc.

Noctua montana, Dahl.

Noctua temera, Hübner.

Noctua sordida, Haworth.

Noctua dubia, Haworth; Stephens; Wood, Ind. Ent., pl. 8, f. 148.

The extensive list of synonymes given above will at once prove this to be another most variable insect. The expansion of the fore wings measures from 1¼ to 1⅝ inch. They vary in their ground colour from a pale reddish hue almost to black; the costa being darker than the disc of the wing, with several short, oblique, dusky lines or spots. The base of the wing is more or less irrorated; the space between the two ordinary stigmata is generally black, the basal one being also often preceded by a triangular patch of black; the supplemental stigma is also generally present; the outer stigma is succeeded by a pale, curved, and wavy fascia, edged with dusky, and there is also another nearer to the apical margin; the extreme margin being also marked with dark dots. The hind wings partake of the ground colour of the fore wings, but much paler, and are darker along the margin.

Mr. Bentley has published the descriptions of a series of twelve varieties of this species, forming so many links, in which are found the chief of the synonymes given above, and of which the following are the short characteristic notes:—

"Var. 2. *Nigricans.*—Anterior wings dusky, with three transverse, dark, waved strigæ, and three stigmata, all margined with black; posterior wings ashy, with dusky margins.

"Var. 4. *Fumosa.*—All the wings blackish, with the posterior stigma tinged with yellow; the teliform stigma is entirely wanting.

"Var. 7. *Dubia*, female.—With four transverse yellow strigæ, the first near the base, and interrupted; the second before the anterior stigma; the third behind the posterior; and the fourth parallel with the [apical] margin, which is spotted with black; posterior wings dusky.

"Var. 9. *Ruris.*—Anterior wings light brown or reddish, with various yellow spots and streaks; the ordinary stigmata tinged with yellow.

"Var. 12. *Obeliscata.*—Anterior wings red-brown, with a long black spot, interrupted by the anterior stigma, and based upon the posterior."

Found in woods, marshes, and gardens, frequenting the flowers of the sun-flower in August. The caterpillar is found in June on low plants, and is of a shiny brown colour, with black spots and a dentated paler coloured line.

SPECIES 16.—AGROTIS MARSHALLANA. PLATE XXIV., FIG. 15.

This new species, which appears to be most nearly allied to the variety of A. nigricans, which has been named dubia, has been kindly communicated to this work by T. Marshall, Esq., M. E. S., with whose name I have inscribed it, as a slight memorial of his excellent practical knowledge of Lepidopterous insects. The fore wings measure an inch and a half in expanse, and are of a dark sooty-brown colour, slightly varied along the principal veins with a lighter gloss, the extreme base being rather lighter than the rest of the wing, and partaking of the colour of the grey-brown thorax. Close to the base of the wing is a very slender dentate, pale, transverse line interrupted behind; then follows, at about one-fourth of the length of the wing from the base, another more waved pale line, edged on both sides with black, with the base of the black teliform stigma resting on its penultimate wave. The two ordinary stigmata are present, but very indistinct, margined with black, the outer one succeeded at a short distance by a slightly-waved transverse row of pale arches (but very much incurved towards the costa), and with a fourth pale streak more irregularly waved and less distinct than the preceding, near the apical margin of the wing, which is dotted with black; the cilia is paler brown, having a fine darker line running through the middle of it. The costa is also marked with several very slight, oblique, pale lines; the abdomen and the hind wings are pale brown, the latter with a central, slightly-darkened lunule, and with the margin

rather darker. The head is fulvous brown, and the prothorax has the frontal crest marked by two curved lines of grey, edged with dark brown in front.

The unique specimen in the collection of Mr. Marshall was taken by him some years ago, at Charing, in Kent, on the stump of a tree.

SPECIES 17.—AGROTIS PASCUEA. PLATE XXIV., FIG. 2.

SYNONYME.—*Agrotis pascuea*, Curtis, Brit. Ent., fol. 165.

This species, now for the first time described and figured, differs from all the preceding in the acutely dentated dark line succeeding the outer stigma. The expansion of the fore wings is nearly 1½ inch, their ground colour being of a very pale buffish-white, varied, especially towards the costa and middle, with darker brownish clouds; there is also a dusky patch along the posterior margin towards the base. From the base runs a nearly straight black line to near the middle of the wing, but towards the hind margin, where it unites with the dentated line above mentioned, the basal stigma is pale and slightly margined with black, and preceded by a short, oblique, black line; behind it is a small oval dusky patch, attenuated towards its base and slightly edged with black; and behind this, towards the centre of the hind margin of the wing, is a larger, oval-oblong, pale space, margined with a black line. The second stigma is dusky in the centre, and edged with a narrow black line. Towards the apical margin is a row of dusky cuneated patches, followed by a marginal row of black dots. The cilia alternately pale and darker brown. The costa is marked with several minute white dots. The hind wings are almost white, with the margin slightly undulated. The antennæ are very pale brown, the joints bidentate in the male for about two-thirds of their length; none of the teeth, however, exceeding in length the thickness of the antennæ. Towards the tip they become serrated, the tip itself being setaceous. The thorax is pale grey, with the head and front browner, the latter having a dark angulated line. The abdomen is more luteous.

This pretty species is extremely rare. It is evidently maritime, having been taken by Mr. Curtis in the Isle of Wight, by Mr. Paget at Yarmouth, and by Mr. Marshall at Lowestoff, in Suffolk. We are indebted to the latter gentleman for the loan of his specimen.

SPECIES 18.—AGROTIS CURSORIA. PLATE XXIV., FIG. 4.

SYNONYMES.—*Noctua cursoria*, Borkhausen; Hübner; Treitschke; Boisduval; Wood, Ind. Ent., pl. 52, fig. 1659.
Noctua mixta, Fabricius; Godart.

This species is about the size of A. valligera. It varies considerably in the colour of the fore wings, from a silvery grey or pale buff to a deep fulvous, reddish or brownish-red, and considerably irrorated with darker atoms, especially towards the centre of the wing; the costa being marked with several dark small spots, arranged in pairs corresponding with the origin of the strigæ, which are distinct, and four in number, one near the base, a second more irregular before the inner stigma, another much curved, and consisting of small arches beyond the outer stigma; these strigæ being pale, and each margined with a dusky line on each side. Near the apex of the wing is a more irregular dark striga, the margin of the wing being marked with a row of dark dots The hind wings are pale, and margined with a broad dusky edge, succeeded by a slender pale line. On the underside all the wings are of a yellowish-white with black dots in the middle, and a row of submarginal dots.

This rare species has been found near Bristol, and also, as we learn from Mr. Doubleday, near Yarmouth, in July.

SPECIES 19.—AGROTIS SUBGOTHICA. PLATE XXIV., FIG. 1.

SYNONYME.—*Noctua subgothica*, Haworth; Curtis; Stephens, Ill. Haust., 2, pl. 22, fig. 3; Wood, Ind. Ent., pl. 9, fig. 149.

This species varies from 1⅓ to 1½ inch in the expanse of the fore wings, which are of a grey-brown hue, with

a broad pale stripe running within the costa, nearly half along the wing. The anterior stigma is nearly triangular, and the posterior one is reniform; the space before, between, and behind which is black, or dark brown. The teliform stigma is very large, and extends to the base of the wing, but is interrupted by two pale, oblique, divaricating stripes; the centre of the spaces between the veins, behind and beyond the outer stigma, is marked by dusky patches, and the apical margin of the wing is very irregularly brown; the costa itself is marked with numerous blackish dots. The posterior margin of the wing is also marked with a long dusky streak. The hind wings are pale, with a slight central lunule and a dusky border. The abdomen is pale, but rather fulvous towards the tip.

Found near London, and Barnstaple, in Devonshire, by W. Raddon, Esq., the celebrated engraver, as well as in Norfolk.

SPECIES 20.—AGROTIS EXCLAMATIONIS. PLATE XXIV., FIG. 13, 14.

SYNONYMES.—*Phal. Noct. exclamationis*, Linnæus; Haworth; Hübner; Stewart; Stephens; Treit.; Wood, Ind. Ent., pl. 9, figs. 150 and 150.

Phalæna clavus, Hufnagle.

Female variety.—Noctua picea, *Haworth; Sam.; Curt.*

Variety?—Agrotis plaga, *Stephens, Ill., H.*, 358; *Wood, Ind. Ent.*, pl. 52, fig. 1660.

This species is extremely variable in its colour as well as markings; it measures from $1\frac{1}{3}$ to $1\frac{2}{3}$ inch in the expansion of the fore wings, which, in the more ordinary character of the species, are of a nearly uniform pale brownish-buff, without irrorations or any other than the ordinary markings, namely, an indistinct basal, wavy, pale line, and another similar and very slender, but edged with black on each side, to the outer side of which the teliform stigma is attached, which is very distinct, oblong, and black; the other stigmata are generally dark and edged with black, but sometimes nearly obsolete; beyond the outer one is a much curved fascia, formed of very slender blackish arches more or less distinct, and sometimes edged with whitish on the outside; a very irregularly angulated pale line runs near the margin of the wing, which is rather darker; the costa is also marked with several pairs of dusky and light dots, and is occasionally tinged with purple; the head aud thorax are of the same colour as the fore wings, the latter marked with a rather broad angulated mark. The hind wings are nearly white in the male, except at the outer angle, which is tinged with brown, as well as the veins. In the female they are brown.

The variety picea, of Haworth, has the fore wings of a pitchy-black colour, without strigæ, and with the two basal stigmata oblong, and the outer one round and black. The hind wings brown.

The Agrotis plaga of Stephens, from Whittlesea Mere, is most probably another variety of this species, in which the ordinary stigmata and strigæ are obliterated, the place of the former occupied by a "very faint brown dash;" whilst the teliform stigma is distinct and elongated into "a stout, deep, black, longitudinal dash towards the inner margin, and above one-third the length of the wing."

The ordinary varieties of this species are very common. The larva precisely resembles those of A. corticea and cinerea; it is found in July under stones and at the roots of grass; it is of a dark brown colour, and glossy, with a pale dorsal line and faint dots; it feeds on groundsel.

SPECIES 21.—AGROTIS NEBULOSA. PLATE XXIV., FIG. 3.

SYNONYME.—*Agrotis nebulosa*, Steph., Ill. Haust., 2, pl. 22, fig. 1; Wood, Ind. Ent., pl. 9, fig. 151.

This very rare species measures only from $1\frac{1}{3}$ to $1\frac{1}{3}$ inch in the expansion of the fore wings, which are pale hoary or whitish-grey; the costa slightly clouded with fuscous, with a cloud of the same hue at the base of the wings, divided from the teliform stigma by a very obscure transverse-waved striga; anterior stigma round, small, its centre and margin dusky; posterior reniform, clouded with fuscous and black; behind this is an arcuated

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submoniliform striga, beyond which the rest of the wing is deep fuscous, with an undulated white striga composed of approximating wedge-shaped spots; in the margin itself is a series of minute, black, subtriangular dots; cilia pale ash; posterior wings pure white. Female nearly of an uniform pale cinereous, with the stigmata and costal spots nearly obsolete.

Taken in July, 1827, by W. Raddon, Esq., near Barnstaple, Devonshire.

Note.—In addition to the preceding species, the Noctua crassa of Hübner (Graphiphora cr. Stephens, nob.) is regarded by Boisduval as a species of the present genus.

GRAPHIPHORA, Ochsenheimer, Hübner, Stephens.

The species of this genus are distinguished from Agrotis, to which they are nearly allied, by having the antennæ simple (at least to the naked eye) in both sexes, or but sub-pectinated in the males. The palpi extending beyond the head, nearly straight, and compressed laterally; the second joint large and securiform, spotted with black on the outside; the third joint short, naked, and obtuse; the thorax almost square, with a small crest behind the collar, which is but slightly or not at all elevated; the fore wings broad, rounded along the apical margin, obtuse at the tip, and glossy, having the two ordinary stigmata distinct (the teliform one being generally obsolete) and separated by black or brown spots. The caterpillars are cylindric, somewhat thickened behind, not being attenuated to the extremities, obscurely coloured, slightly velvety in texture, generally exhibiting two sub-dorsal rows of black dots, of which the two hindermost are most distinct, in which respect they approach the Triphœnæ. They feed upon low plants, beneath the dead leaves of which they conceal themselves during the day. The chrysalides are cylindric-conic and smooth, and buried at a greater or less depth under ground, either without a distinct, or with a very slight cocoon of earth.

In their habits, when arrived at the perfect state, they closely approach the Agrotes; flying with great rapidity at night over the flowers, from which they extract the sweets with their long spiral tongues. By day they conceal themselves beneath the herbage, or affix themselves stationary on walls and the trunks of trees.

The species of this genus, as here arranged, are distributed by Boisduval into his genera Chersotis, Noctua, and Spælotis.

DESCRIPTION OF PLATE XXV.

Insects.—Fig. 1. Graphiphora subrosea.
" Fig. 2. Graphipora renigera, male. 3. A female.
" Fig. 4. Graphiphora pyrophila.
" Fig. 5. Graphiphora crassa (rorida?) (the stout dart).
" Fig. 6. Graphiphora Augur (the double dart). 7. The Caterpillar.
" Fig. 8. Graphiphora Baja (the dotted clay). 9. The Caterpillar.
" Fig. 10. Graphiphora tristigma.
" Fig. 11. Graphiphora brunnea (the purple clay).
" Fig. 12. Graphiphora Dahlii (the barred chestnut).

Plants.—Fig. 13. Atropa Belladonna (Deadly Nightshade).
" Fig. 14. Polypogon littoralis (Perennial Beardgrass).

The whole of the insects figured in this plate are from the cabinet of Mr. Bentley, with the exception of G. Augur and G. Baja, which are from specimens furnished me by Mr. H. Doubleday. The caterpillars are from Hübner. H. N. H.

SPECIES 1.—GRAPHIPHORA SUBROSEA. PLATE XXV., FIG. 1.

SYNONYMES.—*Gr. subrosea*, Steph., Ill. Haust., 2, 200; Wood, Ind. Ent., pl. 9, fig. 153. | *Gr. rhomboidea*, Stephens's Cat., and Ill. H., 2, 128 (nec rhomboidea, Esper).

This very distinct species differs from the remainder of the genus in the strongly pectinated antennæ, as well as in the large size of the under wings. It measures from 1½ to 1⅔ inch in the expansion of the fore wings, which are of a brownish-grey, tinged with rosy; the costa with several dusky spots, two undulated by rather indistinct strigæ towards the base of the wings, a triangular brown patch preceding the basal stigma, and another more oblong between it and the hinder stigma, which is grey, with the centre darker, the latter succeeded by a very curved row of dots, sometimes connected by lunules, beyond which is a dusky submarginal irregular stripe; the apical margin paler, dotted with dusky. The hind wings very pale ashy-buff, with a broad apical dusky fascia. The antennæ in the males are strongly bipectinated to the tip, and fulvescent; those of the female very slightly ciliated.

Specimens of this beautiful insect were captured at Whittlesea Mere in July by Mr. Weaver.

SPECIES 2.—GRAPHIPHORA RENIGERA. PLATE XXV., FIG. 2, 3.

SYNONYME.—*Noctua renigera*, Hübner; Treitschke; Stephens; Wood, Ind. Ent., pl. 9, fig. 154; Boisduval, Ind. Meth. (Spælotis r.)

This species varies from 1⅓ to 1½ inch in the expanse of the fore wings, which are of a blackish-grey colour, varied more or less distinctly with darker markings and irrorations; the base of the wing is dark, and has a slender pale fascia preceding the very much curved and lunulated pale strigæ, margined with dusky, before the place of the anterior stigma, which is obsolete; the middle of the wing is occupied by a dusky bar, broadest towards the costa, and oblique behind, in which appears, but indistinctly, the hinder stigma; then follows a curved row of dark arches, pointed outwardly, but often very indistinct, with an irregular, rather broad, dusky, subapical fascia, and a row of indistinct apical brownish lunules. The hind wings with the base paler, and the anal angle greyish. The female is much more strongly marked than the male, and has the cilia of the hind wings pale ochre, whilst in the male it is pale brown. This is a rare but widely-dispersed species, occurring in July, in Derbyshire, Westmoreland, near Forfar, etc.

SPECIES 3.—GRAPHIPHORA LATENS?

SYNONYME.—*Noctua latens*, Hübner? Treitschke? Stephens, Ill. H., 2, 129; Wood, pl. 9, f. 155.

The following is Mr. Stephens's description of a single specimen, supposed to be this species, which was taken in the south of Scotland in 1827. "Resembling the last in the obscurity of its markings; head, thorax, and abdomen deep cinereous, anterior wings of a glossy ashy-black, most obsoletely strigated transversely, with undulated fuscous lines, visible only in certain positions; the first of which is towards the base and abbreviated; the second anterior to the basal stigma; the last beyond the reniform stigma, and considerably bent; beyond this the wing is darker, and has towards the hind margin an obscure, pale, denticulated striga, the margin itself immaculate; cilia fuscous; stigmata very obscure, with a dark quadrate spot between them; posterior wings obscure, cinereous, with the cilia whitish."

SPECIES 4.—GRAPHIPHORA PYROPHILA. PLATE XXV., FIG. 4.

SYNONYMES.—*Noctua pyrophila*, Wien. Verz.; Fabr.; Ochs.; Stephens; Boisduval (Ind. Meth., Spælotis p.) Wood, Ind. Ent., pl. 9, fig. 156; Guénée (Agrotis p.) | *Bombyx radicea*, Esper. *Noctua tristis*, Fabr. *Noctua similaris*, Fabr.

This species measures from 1⅓ to 1¾ inch in the expansion of the fore wings, which are of a pale brownish

colour, tinged with buff, with numerous soft, darker, irregular, brown markings, whereof those at the base form two double strigæ; the second considerably in advance of the basal stigma, and much waved; this stigma is paler, and between it and the posterior one is a slight dusky striga; beyond the latter stigma is a curved row of whitish dots, edged before with black; then follows a striga of cuneated blackish spots edged with whitish lunules behind, followed by a marginal row of small brown triangular dots, with a paler streak at the base of the cilia. The hind wings are deep brown, but paler at the base. The head, thorax, and body are of the colour of the fore wings.

The species is rare, but very widely dispersed, having been taken as far north as Flisk.

SPECIES 5.—GRAPHIPHORA LUNULINA. Plate XXVI., Fig. 9.

Synonyme.—*Noctua lunulina*, Haworth; Stephens (Gr. l.)

The following is a translation of Mr. Haworth's description of this species. Expansion of the fore wings $1\frac{3}{5}$ inch; wings brown, slightly ashy, with four obsolete paler strigæ, edged with black, as though formed of minute lunules; the first at the base almost obliterated, the second waved, preceding, and the third arched beyond the middle of the wing; between these is a pale lunule and some dots in the place of the posterior stigma; the anterior stigma is obsolete; then follows a fourth dentated striga, and a row of minute black dots on the margin; ciliæ brown, but slightly ashy. Hind wings ashy, with a brown border; the extreme margin pale, with whitish ciliæ. Taken in Cambridgeshire.

SPECIES 6.—GRAPHIPHORA BIRIVIA.

Synonyme.—*Noctua birivia*, Hübner; Curtis's Guide; Stephens; Wood, Ind. Ent., pl. 52. fig. 1662; Boisduval, Ind. M. (Spælotis b.)

This species is of the size of the female of Agrotis exclamationis. The thorax and fore wings are of a mouse-grey colour, varied with yellowish at the base, between the stigmata and at the apex, with whitish lines and spots. The first and second strigæ are entire and slender, the stigmata distinct and edged with whitish, succeeded by a slender lunate pale striga, bent in the middle towards the ciliæ, which is succeeded by a yellowish dentated striga. The ciliæ grey, but whitish in the hind wings of the female, which have also a dark margin.

SPECIES 7.—GRAPHIPHORA CRASSA. Plate XXV., Fig. 5.

Synonyme.—*Noctua crassa*, Hübner; Haworth; Treitschke; Stephens? Wood, Ind. Ent., pl. 9, fig. 157.

This is another obscure species, the fore wings measuring about $1\frac{3}{5}$ inch in expanse, and being of a shining brown colour clouded with blackish, the base marked with a blackish line, and various irregular markings of the same colour between and encircling the stigmata, which are very obsolete. A third stigma, but very imperfect, and occasionally entirely obliterated, exists. Occasionally the ordinary strigæ are likewise visible, of a paler colour edged with brown; namely, one at the base, another preceding, a third following the stigmata, and the fourth destitute of the brown edging near the apical margin; the hind wings are pale brown, greyish at the base, with a darker margin and veins. The antennæ are slender, with very slight pectinations in the male. Found in Norfolk, Shropshire, Cambridge, Scotland, as well as near London, but not common.

SPECIES 8.—GRAPHIPHORA AUGUR. Plate XXV., Fig. 6, 7.

Synonymes.—*Noctua Augur*, Fabr.; Hübner; Treitschke; Haworth; Stephens; Wood, Ind. Ent., pl. 9, fig. 158; Boisduval (Ind. Meth., Spælotis a.)

Noctua omega, Esper.

Noctua assimilans, Borkhausen.

Noctua Hippophaes, Geyer.

This species measures from $1\frac{1}{2}$ to $1\frac{3}{4}$ inch in the expanse of the fore wings, which, as well as the entire

insect, are of a shining brown colour, slightly tinged with coppery. Near the base of the wing is a pale angulated striga, and another undulated one before the anterior stigma. These strigæ are almost obsolete, being chiefly visible by their dark slender edging. The stigmata are of the same colour as the rest of the wing, and edged slenderly with black, the anterior one being connected by a slender line with the preceding stigma (which is open in front); the posterior stigma is marked behind with a small angulated patch of black. Beyond this stigma is a very curved striga formed of very delicate black arches, sometimes almost obliterated; half-way between which and the margin is a dusky bar, and there is a slight row of blackish triangular marginal dots; a black patch behind the anterior stigma indicates the place of the supplemental one; the costa is marked with several pale and black oblique dots; the hind wings and abdomen are scarcely paler than the front ones. The caterpillar is pale brown, with two rows of black patches along the back, and a yellow line on each side above the feet. It feeds on low plants and under decayed bark, and undergoes its transformation in May, and the moth appears in July. It occurs not uncommonly in various parts of the south of England.

SPECIES 9.—GRAPHIPHORA BRUNNEA. PLATE XXV., FIG. 11.

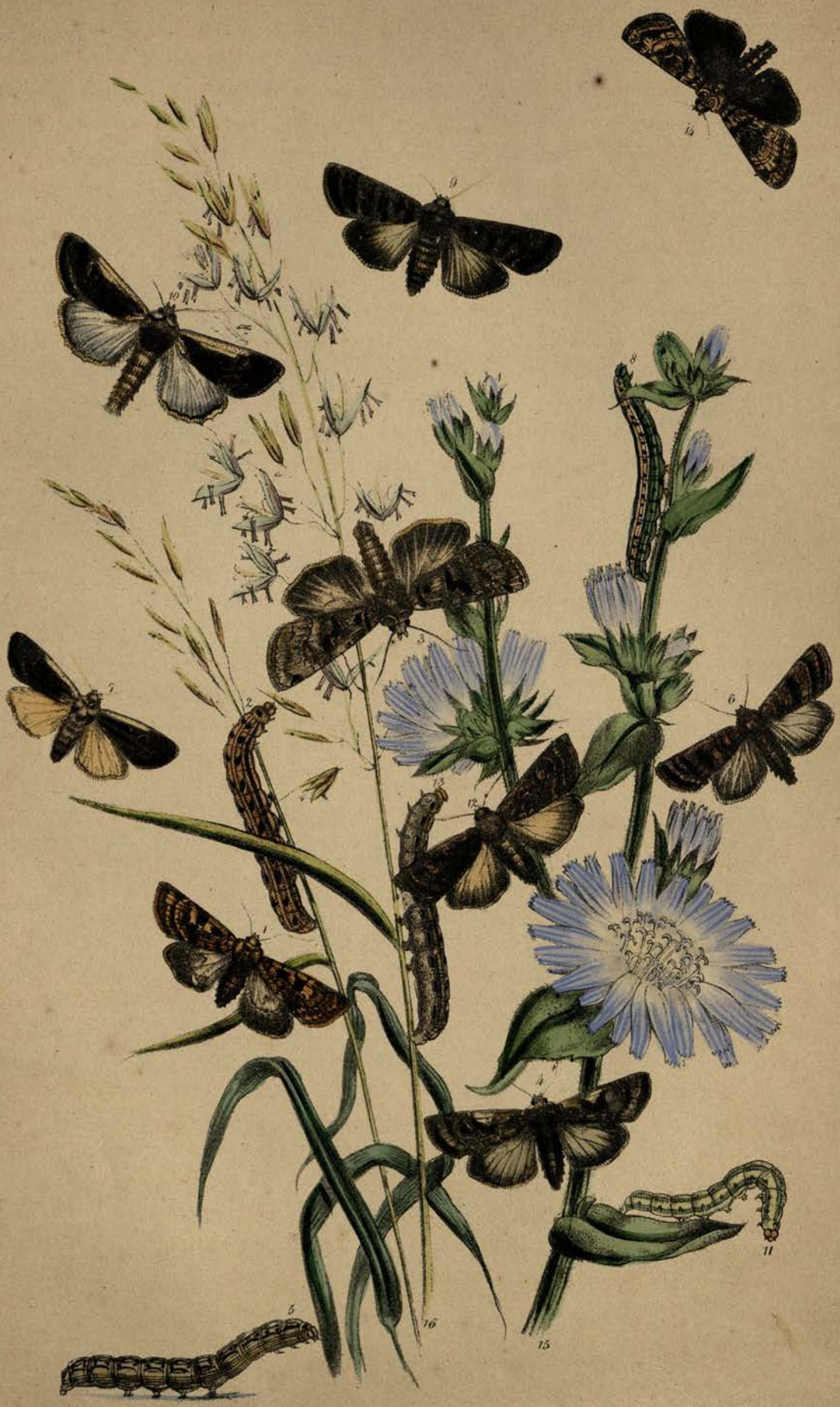
SYNONYMES.—*Noctua brunnea*, Wien, Verz.; Fabricius; Hübner; Haworth; Treitschke; Stephens; Wood, Ind. Ent., pl. 9, fig. 159; Boisduval (Noctua b.)
Noctua lucifera, Esper.
Noctua Fragariæ, Borkhausen.

This handsome species varies from $1\frac{1}{2}$ to $1\frac{2}{3}$ inch in the expansion of the fore wings, which are of a rich purplish or very dark brown, with a double dark abbreviated striga at the base, a nearly straight bar preceding the anterior stigma, which is of the same colour as the rest of the wing, slightly margined with luteous and black, and followed by a nearly quadrate, dark, liver-brown patch, extending to the costa; the second stigma is yellowish, shaded with brown in the middle, followed at a short distance by a darker bar, and a large patch extending to the costa, but terminating before the apex. In some specimens the ordinary strigæ are rather more distinct; the one beyond the posterior stigma being formed of numerous small blackish arches enclosing a pale fascia, succeeded by a broader, posteriorly irregular, uniformly brown fascia. There are also the rudiments of a small black supplemental stigma behind the ordinary basal one. The hind wings are paler brown, slightly lighter at the tip; with the cilia, as well as the sides and tip of the abdomen, rosy brown. The caterpillar is found in the spring under broad-leaved plants, its food consisting of low-growing weeds. It is naked, and of a coffee-brown colour; the head black, with two white stripes; the back with a white longitudinal line, and the sides with lateral stripes; each segment with two dark brown lines. The moth appears at the end of July. Not rare; found in the woods round London and elsewhere. Perth, Mr. Douglas.

SPECIES 10.—GRAPHIPHORA CANDELISEQUA? PLATE XXVI., FIG. 12, 13.

SYNONYME.—*Noctua Candelisequa?* Wien. Verz.; Hübner; Treitschke; Stephens; Wood, Ind. Ent., pl. 9, fig. 160; Boisduval (Noctua e.)

This species measures $1\frac{1}{2}$ inch in the expansion of the fore wings, which are of a red-brown colour irrorated with glaucous, the dusky strigæ occasionally very indistinct; the first abbreviated behind, succeeded by a pale dot; a second undulated before the anterior stigma; another dentated beyond the outer stigma, succeeded by a paler one, slightly undulated; the stigmata are pale luteous brown, edged with a dusky line, and greyish in the middle. There is also a dusky dot behind the anterior stigma in the place of the supplemental one, and there is a row of marginal black spots; the hind wings are luteous brown, with the margin darker. The ciliæ are pale reddish. The antennæ are exceedingly slender, with the ciliations scarcely perceptible. The abdomen is pale luteous brown.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The caterpillar is described by Treitschke as of a blackish-brown, striped with reddish and white, with a reddish-yellow head, and with small black lines at the sides of the back. Mr. Stephens reared a specimen, which he gives as identical with the Candelisequa, from a caterpillar found at Darenth Wood, Kent, in May, the moth appearing in July.

SPECIES 11.—GRAPHIPHORA TRISTIGMA. PLATE XXV., FIG. 10.

SYNONYMES.—*Graphiphora tristigma*, Ochsenheimer; Treitschke; Stephens; Wood, Ind. Ent., pl. 10, fig. 161; Boisduval, Ind. Meth., p. 105 (Noctua tr.)

Noctua ditrapezium, Borkhausen; Hübner, Noct., fig. 115.
Noctua rhomboidea, Esper?

This species measures rather more than 1½ inch in the expanse of the fore wings. It has much of the character and appearance of Gr. brunnea, the fore wings and body being of a dark rich purplish-brown colour, varied with strigæ as in that species; close to the base of the wings is a black spot of variable form and size; another black patch is placed immediately before the basal stigma, and extends backwards; and there is a third rhomboidal spot, of the same colour, between the stigmata, both of which are of a brown colour, thus differing from Gr. brunnea; beyond the second stigma is a narrow and much curved pale striga, followed by a broader, irregular, dark one, the succeeding space being of the ground colour of the wings, minutely speckled with ochre colour. The hind wings are pale grey-brown, with the hind margin darker; the ciliæ of all the wings are rosy brown. Mr. Humphreys has observed that the anterior tarsi are annulated with black and white, whereas they are light brown in Gr. brunnea, with the last joint black.

The caterpillar closely resembles that of Gr. triangulum. On each side, the back is marked with a blackish line, bordered by a white line on each side; above the feet there also runs a reddish line. It is said by Treitschke to feed on the Leontodon Taraxacum. The moth appears in July and August, and has been taken (but by no means commonly) at Darenth, Ripley, and Epping. Mr. H. Doubleday mentions its apparent identity with the Gr. rhomboidea of Ochsenheimer, but Boisduval follows Stephens in giving them as distinct.

DESCRIPTION OF PLATE XXVI.

INSECTS.—Fig. 1. Graphiphora festiva (the ingrailed clay). 2. The Caterpillar.
" Fig. 3. Graphiphora triangulum (the double square spot).
" Fig. 4. Graphiphora C. nigrum (the setaceous Hebrew character). 5. The Caterpillar.
" Fig. 6. Graphiphora bella (the small square spot).
" Fig. 7. Graphiphora plecta (the flame shoulder). 8. The Caterpillar.
" Fig. 9. Graphiphora lunulina, a female (the crescent-striped).
" Fig. 10. Graphiphora musiva (the light-edged clay). 11. The Caterpillar.
" Fig. 12. Graphiphora candelisequa (the brown clay). 13. The Caterpillar.
" Fig. 14. Graphiphora depuncta.

PLANTS.—Fig. 15. Cichorium Intybus (wild Succory).
" Fig. 16. Arrhenatherum arenaceum.

Graphiphora festiva, triangulum, C. nigrum, bella, and plecta, are from specimens furnished me by Mr. H. Doubleday. Lunulina is from a dusky female specimen in the cabinet of Mr. Stephens, the males are described as much more distinctly marked. Candelisequa is from a specimen in the collection of Mr. Bentley; but it does not appear to correspond with the figures of the Continental species. Depuncta is from a British specimen, kindly lent by Mr. Reeves, for the purpose of being figured in this work. Musiva being generally disallowed as a British insect, I have thought it better to figure the Continental species, which I have taken from Godart.

The caterpillars are from Hübner; that of Candelisequa is, of course, the larva of the true Continental species, and probably not of the insect in Mr. Bentley's collection, which may possibly prove a variety of some other species. H. N. H.

SPECIES 12.—GRAPHIPHORA TRIANGULUM. Plate XXVI., Fig. 3.

Synonymes.—*Phalæna triangulum*, Hufnagle; Treitschke; Stephens; Boisduval; Wood, Ind. Ent., pl. 10, fig. 162.
Phalæna ditrapezium, Wien. Verz.
Noctua sigma, Hübner; Haworth; Esper; Borkhausen; Ernst; Donovan, vol. 16, pl. 562.

This species measures nearly 1¾ inch in the expanse of the fore wings, which are of a pale shining brown colour tinged slightly with pinkish; at the base of these wings is a black patch (towards the posterior margin of the wings), through which runs a very slender pale line, which also appears on the costa, which is also marked by a black dot; at a short distance from this runs a pale slender oblique line, slenderly edged with dusky, followed in the principal area of the wing by a large black patch (the base of which is extended to the costa), and within which is the basal stigma opened towards the costa; behind this dark patch the wing is dusky; and beyond the second stigma, which is concolorous with the rest of the wing, is a pale arched striga, edged by slender blackish lunules, forming dots on the veins; a similar row of dots runs parallel with the extremity of the wing, terminating in a small black blotch on the costa. The hind wings are pale brown, as are also the head and front crest of the thorax. The caterpillar is figured by Hübner, under the name of N. sigma, and is of a reddish ashy-grey colour, with a brighter red line on each side, and a black dorsal line, each ring being marked with two dusky streaks at the sides. This species is far from rare, and is very widely distributed over the greater part of the country.

SPECIES 13.—GRAPHIPHORA DEPUNCTA. Plate XXVI., Fig. 14.

Synonymes.—*Phalæna* (*Noct.*) *depuncta*, Linnæus; Ochs.; Treitschke.
Noctua mendosa, Hübner, Noctua, figs. 120 and 502.

We have much pleasure in giving a figure of this species, which, although mentioned as British by Mr. Haworth, in his Prodromus, was not included in his Lepidoptera Britannica; and, as Mr. Stephens had never seen a British specimen, its claim to be considered as a native insect was exceedingly questionable. We are indebted to Mr. T. Reeves, junior, of Carlisle, for an opportunity of describing and figuring his unique specimen, captured near that city, and which is in beautiful preservation. The fore wings measure nearly 1½ inch in expanse, and the general colour of the insect is a rather bright buff-coloured pale brown, shaded with darker brown; close to the base of the fore wings are two black dots, followed at a short distance by a black transverse row of three spots, the middle one being triangular, and joining the anterior stigma, which is concolorous and margined with a slender pale circle; the space between the two stigmata is very short, and occupied by a triangular patch of brown, extending towards the costa; the outer stigma is large and reniform, being posteriorly brown; then follows a very delicate pale curved striga, succeeded by a curved row of black dots, and a reddish-brown irregular striga, with a row of marginal dots at the base of the cilia. The hind wings are rather dark brown. The caterpillar, figured by Hübner, is violet-coloured, with a brown head, with two yellow dorsal lines and a whitish lateral streak.

SPECIES 14.—GRAPHIPHORA BAJA. Plate XXV., Fig. 8, 9.

Synonymes.—*Noctua baja*, Wien. Verz.; Hübner; Haworth; Stephens; Wood, Ind. Ent., pl. 10, fig. 163; Boisduval, Ind. Meth. (Noctua b.), p. 106.
Noctua tricomma, Esper.

This species varies from 1½ to 1⅔ inch in the expansion of the fore wings, which are of a grey, or brownish grey-coloured, somewhat clouded, and obsoletely strigated, with several rows of dusky dots, or slightly distinguishable lunules; the stigmata are not very distinct, the anterior having a pale circle, edged slightly with

dusky, and the outer stigma large and reniform, with a pale margin; beyond the latter runs a curved pale striga, followed by another rather darker than the ground-colour of the wing, having a blackish patch on the costa. The hind wings are reddish-grey, with the margin darker, and the cilia rufescent. The female is darker-coloured, with the strigæ still more obsolete,

The caterpillar is pale reddish-brown, slightly varied with darker markings, and with three pale stripes down the back, and a reddish-yellow one on each side, the spiracles being marked with dark freckles. It feeds on Atropa Belladonna, and other low plants in April, the moth appearing in July. It is not a rare species.

SPECIES 15.—GRAPHIPHORA DAHLII. PLATE XXV., FIG. 12.

SYNONYMES. — *Noctua Dahlii*, Hübner; Treitschke; Boisduval (Noctua D.); Stephens.

Noctua Erythrocephala, Haworth, Sam.; Stephens; Wood; Ind. Ent., pl. 10, fig. 164; and our page 125, ante.

Noctua Silene, Borkhausen.

This species generally measures less than 1½ inch in the expanse of the fore wings, which, as well as the body, are of a pale fulvous brown, or greyish-red colour, with rather indistinct cloudings and strigæ, and without the black patch near the extremity of the front margin of the wings; the hind margin is dusky; the fore stigma is but slightly indicated (having a black dot behind it), and is succeeded by a dusky or chestnut-coloured patch, of a somewhat rounded form; beyond the second stigma is a pale striga, edged with dusky dots, and the extremity of the wing dusky castaneous, in which is a pale curved, and not very irregular, striga, and a row of apical dots. The hind wings dusky, with the margin darker, and a darker central lunule. The antennæ in the males are distinctly pectinated.

The larva is well figured by Hübner; it is of a brown-red colour, covered with brown and yellow speckles, with a yellow dorsal line, and the head dark brown. It is found under low broad-leaved plants, in May; and the moth appears in July. It is rare in the woods of Kent.

SPECIES 16.—GRAPHIPHORA FESTIVA. PLATE XXVI., FIG. 1.

SYNONYMES. — *Noctua festiva*, Wien. Verz.; Hübner; Haworth; Treitschke; Stephens; Wood, Ind. Ent., pl. 10, fig. 165.

Noctua primula, Esper.

Noctua mendica, Fabr.

Noctua subrufa, Haworth (variety).

This handsome insect varies from 1¼ to 1½ inch in the expanse of the fore wings, which are of a light brownish fulvous, tinged with reddish, and varied with darker shades; the stigmata pale luteous, or whitish; the anterior preceded by a small triangular black dot, which is united anteriorly to a pale curved striga, edged with dusky, and which extends in a small patch to the costa; the space between the stigmata is dark rich brown, truncated behind by the great median vein; the supplemental stigma is indicated by a black dot; the second stigma is marked behind with a small dusky oval patch; at a short distance beyond this is a curved row of pale festoons, edged with slight dusky lines, and another fine pale and rather indistinct striga runs nearly parallel to the outer margin of the wing, which is marked with black dots. The hind wings are brown, dusky on the margin; and the ciliæ of all the wings are flesh-coloured. The variety *subrufa*, of Haworth, differs in having the fore wings of the male redder-coloured, with the markings less conspicuous.

The caterpillar is of a yellowish-red colour, sprinkled with yellow dots; there is a pale dorsal line, and each segment has two dusky spots on the sides; the head is dark brown. It feeds on the primrose, and is full-grown in May and June, and goes underground to pass into the pupa state. The moth appears in July and August. It is not a rare species, and has occurred in numerous distant parts of the country.

SPECIES 17.—GRAPHIPHORA BELLA. Plate XXVI., Fig. 6.

Synonymes. — *Noctua bella*, Borkhausen; Treitschke; Godart; Boisduval.
Noctua quadrata, Hübner.
Noctua rubi, Vieweg.
Noctua punicea, Haworth; Stephens; Wood, Ind. Ent., pl. 10, fig. 169.

This obscurely-marked species measures from $1\frac{1}{6}$ to $1\frac{1}{3}$ inch in the expanse of the fore wings, which are of a rosy-brown colour, with darker brown strigæ; an oblong brown patch of dark brown between the stigmata, and another near the extremity of the costa; there is a pale transverse striga near the base of the wing, and another preceding the anterior stigma, edged with brown; the stigmata are circled with pale luteous; beyond the outer stigma is a pale curved striga, and another near the apical margin; the space between them and between the outer striga and the margin being darker; there is also a black dot in the place of the supplemental stigma; the costa is marked with several dark dots. The hind wings are ashy-brown, the ciliæ having a rosy tinge. Varieties occur with the strigæ more or less indistinct. This is rather a common species, which flies in June, according to Mr. Stephens; but Boisduval gives August as the time of its appearance. It occurs in various parts of the country round London, and has also been taken in Shropshire. It is on the authority of Dr. Becker, of Wiesbaden, that the name of this species has been changed from punicea to bella. Mr. Haworth had, indeed, pointed out its apparent want of agreement with Hübner's figure of the former species.

SPECIES 18.—GRAPHIPHORA C. NIGRUM. Plate XXVI., Fig. 4, 5.

Synonymes.—*Phal. Noct. C. nigrum*, Linn.; Fabr.; Ochsenh.; Haworth; Stephens; Wood, Ind. Ent., pl. 10, fig. 166.
Noctua Nun_atrum, Borkhausen.
Noctua triangulum, Naturforscher.

This very distinct species measures from $1\frac{1}{4}$ to $1\frac{1}{2}$ inch in the expansion of the fore wings, which are of a shining dark ashy-brown colour, with a very slender curved pale striga, edged with a black line close to the base of the wing, followed by a short black streak, in front of which is a fulvous dot; then follows a very slender transverse pale striga running across the wing, adjoining which is the small fulvous supplemental stigma, in front of which is an elongated triangular black patch, in the chief area, united behind with a second similar patch; the space between them, extending quite to the costa, being of a pale brownish-white colour, and which appears to consist of the anterior stigma modified in form; the second stigma is pale and much curved; beyond this is a curved and very indistinct row of pale arches, and near the tip of the costa is a black patch. The hind wings are pale ashy, with the margin darker; the front of the thorax is pale luteous.

The caterpillar is reddish-brown, shaded with black, with a slender white dorsal line, and with black lateral spots. It feeds on Alsine media and Epilobium palustre. The moth appears in May and July. Treitschke also reared it in September, in which month Mr, Doubleday has found it at Epping, and Mr. Douglas on ivy-blossom, the 30th of the same month. It is a rather abundant species, and is very widely distributed throughout the country.

SPECIES 19.—GRAPHIPHORA MUSIVA. Plate XXVI., Fig. 10, 11.

Synonyme.—*Graphiphora Musiva*, Hübner; Treitschke; Godart; Boisduval (Chersotis M.); Stephens; Wood, Ind. Ent., pl. 10, fig. 167.

This species measures about $1\frac{1}{2}$ inch in the expanse of the fore wings, which are of a red-brown colour, with a dark central streak running longitudinally from the base to the second stigma, the space between it and the costa being pale buff, by which the anterior stigma is rendered obsolete; the second stigma is, however, distinct, and edged with whitish; beyond this is a curved pale streak, and a second near the apical margin of the wing; the front of the thorax is pale luteous buff, with a black transverse streak. The hind wings are whitish, with a rather more dusky border.

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The only specimen of this insect yet indicated as British is one placed by Dr. Leach in the British Museum collection, the figure of which, given by Mr. Wood, exhibits a strong variety, if, indeed, it be specifically identical with the true Musiva. In this the anterior stigma is distinct, and preceded by a triangular black patch, and followed by a transverse patch of the same colour, by which it is separated from the second stigma; there is also a black V-like mark behind the anterior stigma, and several short black spots towards the apical margin of the fore wings. The species occurs on the Continent in August. The caterpillar is figured by Hübner of a yellowish-green colour, with two longitudinal white streaks and a brown head.

SPECIES 20.—GRAPHIPHORA PLECTA. PLATE XXVI., FIG. 7, 8.

SYNONYME.—*Phalæna Noctua plecta*, Linn.; Fabr.; Hübner; Haworth; Treitschke; Stephens; Wood, Ind. Ent., pl. 10, fig. 168. Boisduval (Chersotis p.)

This very distinct species measures 1¼ inch in the expansion of the fore wings, which are of a brownish-purple colour, the costa, from the base to beyond the middle and the stigmata, being of a whitish-buff tinged with reddish; a black striga runs from the base along the middle of the wing, cut in two near the base by the great median vein, and subsequently interrupted by the stigmata: near the apical margin is an ill-defined pale streak, and the apical margin has a row of black dots. The hind wings are almost white, with luteous ciliæ.

The caterpillar is dark green, speckled with white and black dots, a brownish dorsal line and pale yellowish lateral ones above the feet. The head brown. It feeds on celery, beet-root, endive, and other herbs, in May and August; the insect appearing to be double-brooded, and flying at the end of June and beginning of September. It is a rather common species.

DESCRIPTION OF PLATE XXVII.

INSECTS.—Fig. 1. Semiophora gothica (the Hebrew character).
" Fig. 2. Orthosia instabilis (the clouded drab). 3. A mottled variety. 4. A dark variety.
" Fig. 5. Orthosia intermedia (the connecting drab).
" Fig. 6. Orthosia munda (the twin-spotted quaker).
" Fig. 7. Orthosia humilis (the lunar under wing). 8. A dark variety.
" Fig. 9. Orthosia gracilis (the lead-coloured drab).
" Fig. 10. Orthosia pusilla (the dwarf quaker).
" Fig. 11. Orthosia cruda (the small quaker).
" Fig. 12. Orthosia Upsilon (the dingy shears). 13. The Caterpillar.

PLANT.—Fig. 14. Melica uniflora (wood melic grass).

Orthosia gracilis, O. Upsilon, O. lunosa and var., and O. pusilla, are from specimens in the cabinet of Mr. Bentley. The rest are from specimens, for which I am indebted to Mr. H. Doubleday, who has also procured for me the larva of S. gothica, which is figured in plate 29, as is also that of O. cruda (ambigua, Hübn.) The larva of O. Upsilon is from Hübner. H. N. H.

SEMIOPHORA, STEPHENS.

The typical and indeed only species, upon which the present group has been proposed by Mr. Stephens, has the fore wings more elongated and less truncate at the tip than in the Graphiphoræ, whilst its strong markings separates it from the Orthosiæ, with which it is united by Boisduval. It is from this latter character that the generic name has been proposed, derived from the Greek Σημεῖον, a mark, and φρέω, to bear; the antennæ of the males are strongly bipectinated, on which account it has been united with Episema; the thorax is very thickly clothed with woolly hairs, the hind wings are rather small, and the body rather short; the palpi have the apical joint exposed, and slightly porrected in front of the eyes. The caterpillar is naked, and has the anterior segment of the body very slender. It feeds on various trees, as well as upon different low herbs,

rumex, etc.; the individuals found on the elm being of a yellowish tint, whilst they are glaucous which are found on the rumex. They go underground to effect their transformations. Guénée unites it with Orthosia instabilis, stabilis, etc., to form his genus Tæniocampa (Ann. Soc. Ent. France, 1839, p. 477). The perfect insect is vernal in the term of its appearance.

SPECIES 1.—SEMIOPHORA GOTHICA. PLATE XXVII., FIG. 1, & PLATE XXIX., FIG. 19 (LARVA).

SYNONYMES.—*Phal. Noct. gothica*, Linn.; Fab.; Treitschke; Haworth; Stephens; Wood, Ind. Ent., pl. 10. fig. 170.
Noctua Nun-atrum, Wien. Verz.; Fabr.; Hübner.

This pretty species varies from 1½ to 1½ inch in the expansion of the fore wings, which are of a greyish-brown colour, with two black dots near the base, a black central patch, on which is placed the anterior stigma, forming a deep emargination in front; near the base of this patch is a small black dot on the costa, and from its hinder edge runs a slender pale striga, edged with brown; the outer stigma is almost obsolete, but the supplemental one is indicated by a black short dash behind the fore stigma, the space between it and the large black patch being of a rich brown colour; beyond the second stigma is a purplish-brown bar, terminating before and behind in a slender, pale, irregular striga; the costa near the tip is dark coloured, and marked with several short, oblique, pale lines; the hind wings and body are of a uniform dull palish brown colour.

The caterpillar is yellowish-green, dotted with paler colour, with a white stripe on each side, and a yellow back. The head is spotted with white. It feeds, according to Treitschke, on Galium aperine, Quercus Robur, various species of Lonicera, and other low herbs. The moth appears in April, but Boisduval gives both the spring and autumn as its period of flight.

ORTHOSIA, OCHSENHEIMER.

The species of which this genus is composed, in the works of English Lepidopterists, are characterised by the thickness and woolly clothing of the thorax, the shortness of the body, the slight marking of the wings, and the porrected palpi, with the last joint clothed with scales. The hind wings are rather small, and the antennæ long and setaceous, being, however, pectinated in the males of some species, and simply serrated in others. The thorax is not crested; the fore wings are either rounded or slightly acuminated at the tips.

The caterpillars are smooth and naked, with longitudinal pale stripes; they feed either on the leaves of trees or upon low-growing plants, and the moths are either vernal or autumnal in the period of their appearance.

Those species of which Mr. Stephens has composed his first section with the character—"Anterior wings somewhat rounded at the tip, antennæ of the males more or less pectinated"—O. instabilis, gracilis, stabilis, etc., have been separated by M. Guénée, under the generic name of Tæniocampa, the caterpillars having all the longitudinal strigæ very distinct. He has, however, added to these Semiophora gothica and Glæa rubricosa. Boisduval, on the other hand, forms two sections in the genus Orthosia, characterised by the characters Larvæ herbicolæ and Larvæ arboricolæ, placing the two last-mentioned species in the former section, whilst the other comprises the rest of M. Guénée's species of Tæniocampa.

SECTION I.—TÆNIOCAMPA, GUÉNÉE.

SPECIES WHICH ARE VERNAL IN THE TIME OF THEIR APPEARANCE IN THE WINGED STATE.

SPECIES 1.—O. (TÆNIOCAMPA) INSTABILIS. PLATE XXVII., FIG. 2, 3, 4.

SYNONYMES — *Noctua instabilis*, Wien Verz.; Fabr.; Hübner; Treitschke; Boisduval; Stephens; Wood, Ind. Ent., pl. 10, fig. 171; Albin, pl. 76, fig. a—d.
Noctua contracta, Esper.
Noctua subsetacea, Haworth (variety).
Noctua nebulosa, Haworth (variety).
Noctua fuscata, Haworth (variety).
Noctua angusta, Haworth (variety).

This very variable insect measures from 1½ to 1¾ inch in the expanse of the fore wings, which vary from a

grey to a red-brown colour, variously shaded or marked with deeper tints, especially a darker, irregular, indistinct bar running across the wing between the stigmata, which are ordinarily obsolete, but occasionally distinct, and of a greyer hue than the rest of the wing, and slightly encircled with white. Near the apical margin of the wing is a pale striga, edged with brown on the inside, and rather elbowed near the costa, where is a distinct brown patch. The hind wings are grey or brown, with the margin and a central lunule dusky brown; the joints of the antennæ of the male have the sides angulated and setose. The varieties are very numerous. That named subsetacea by Haworth has the wings ashy, clouded with grey, and three grey lunules attached to the posterior whitish lunule. The N. nebulosa, Haw., has the wings hoary grey, with two reddish-brown strigæ, and a terminal one formed of three subtriangular spots. Noctua fuscata, Haw., has the fore wings blackish, with the two stigmata encircled with white rings, and a subapical, slightly undulated, pale striga; and N. angusta, Haw., has the wings varied with livid and brown colours, and with the white stigmal circles and apical strigæ less distinct than in the preceding variety. The caterpillar is green, with a white line down the back and a yellow one on each side. It feeds on the oak, in the autumn, and the moth, which is very abundant, appears in March and April.

SPECIES 2.—O. (TÆNIOCAMPA) INTERMEDIA. Plate XXVII., Fig. 5.

Synonyme.—*Orthosia intermedia*, Stephens, Illust. H., 2, p. 141; Wood, Ind. Ent., pl. 10, fig. 172.

This species measures 1½ inch in the expansion of the fore wings, and is closely allied to the preceding species, from which, however, the much more strongly-pectinated antennæ of the males remove it; the fore wings are of a grey-brown colour, with three darker fasciæ, the stigmal circles and ordinary strigæ being pale, the hinder striga is duplicated; the hind wings are dusky ash, with the cilia slightly rosy. Found in Richmond Park, by Mr. Stephens.

SPECIES 3.—O. (TÆNIOCAMPA) GRACILIS. Plate XXVII., Fig. 9.

Synonymes.—*Noctua gracilis*, Wien. Verz.; Treitschke; Fab.; Hübner; Stephens; Wood, Ind. Ent., pl. 10, fig. 173.
Noctua lepida, Borkhausen.
Noctua collinita, Esper.
Noctua subplumbea, Haworth; Curtis.

This species measures 1½ inch in the expanse of the fore wings, and is allied to the preceding in its strongly-pectinated male antennæ. It is of a greyish-slate colour, slightly clouded with greyer tints, with the ordinary strigæ very indistinct; a very indistinct curved one, varied with ferruginous, running between the stigmata, which are concolorous, but circled with pale whitish-buff; and the subapical striga is more distinct and rather irregular, with several black dots on its inner margin. There are also several black dots on the costa, and an apical row of small ones at the base of the cilia. The hind wings are pale brown, with the margin darker. Varieties occur in the strength of the markings. The caterpillar is green, with the sides yellow, each segment with a black spot and several dusky dots. It feeds on the oak and other trees, upon the trunks of which the moth is found in March and April; but it is very rare in the woods round London. Found flying round the blossoms of Sallow by Mr. H. Doubleday, at Epping.

SPECIES 4.—O. (TÆNIOCAMPA) MUNDA. Plate XXVII., Fig. 6.

Synonymes.—*Noctua munda*, Wien. Verz.; Fabr.; Ochs.; Tr.; Stephens; Wood, Ind. Ent., pl. 10, f. 174,
Noctua gemina, Esper.
Noctua geminata, Haworth.
Noctua bimaculata, Haworth; Curtis (variety).
Noctua Lota, Hübner.

This species measures somewhat more than 1½ inch in the expansion of the fore wings, which are of an ashy-grey, varying to pale ferruginous, slightly clouded with darker tints, with the ordinary stigmata and strigæ quite or

nearly obsolete, the subapical one alone appearing very indistinctly, preceding three pairs of black dots, the middle ones being most distinct, the others being sometimes obsolete, as in the variety named Noctua bimaculata by Haworth. Other varieties occur with a dark reddish-brown striga before the anterior stigma, a bent one of brighter colour between the stigmata, a bent one behind the posterior stigma, and another subapical one marked as in the others with black dots, which are also occasionally obsolete. The caterpillar is black, varied with grey, and a dusky red dorsal stripe. It feeds on the oak, and various other trees; and the moth appears in April, being found on the trunks of oak; also flying about Sallow blossoms, but very rare.

DESCRIPTION OF PLATE XXVIII.

INSECTS.—Fig. 1. Orthosia stabilis (the common quaker).
" Fig. 2. Orthosia Miniosa (the blossom under wing). 3. The Caterpillar.
" Fig. 4. Orthosia Litura (the brown spot pinion).
" Figs. 5, 6, & 7. Orthosia pistacina, three varieties (the pale-headed chestnut). 8. The Caterpillar.
" Fig. 9. Orthosia Lota (the red line quaker).
" Fig. 10. Orthosia macilenta (the yellow line quaker).
" Fig. 11. Orthosia pallida (the pale quaker).
" Fig. 12. Orthosia sparsa (the powdered quaker).

PLANT.—Fig. 13. Cotabrosa aquatica (water whorl-grass).

Fig. 11 is from the cabinet of Mr. Stephens; all the other insects on this plate are from specimens presented to me by Mr. H. Doubleday,—the caterpillars are from Hübner; in plate 29 will be found the larva of O. stabilis from a specimen sent me by Mr. Doubleday. H. N. H.

SPECIES 5.—O. (TÆNIOCAMPA) SPARSA. PLATE XXVIII., FIG. 12.

SYNONYME.—*Noctua sparsa*, Haworth; Stephens; Wood, Ind. Ent., pl. 10, fig. 175.

This delicately-coloured species measures about 1½ inch in the expanse of the fore wings, which are of a greyish-ashy colour, powdered with minute dusky atoms, and with a small blackish dot near the base of the wings; the stigmata are slightly ashy and very indistinct, the anterior one being very small, and both encircled by a pale line, scarcely distinguishable from the rest of the wing; beyond this is a series of minute blackish dots on the veins, forming a curved line, and followed by a narrow pale striga running parallel with the apical margin, bordered in front with dusky; the antennæ, cilia, and fore margin of the fore wings are fulvous buff; the hind wings are light grey-brown, with the margin dotted with blackish; a central lunule of the same colour, and the fringe whitish. The ground-colour of the wing varies in different specimens, from pale grey to rusty grey, and deep brownish-ash; the ordinary strigæ are almost distinct. The caterpillar is described by Mr. Haworth as feeding on the topmost twigs of Salix viminalis, which it draws together, and thus quite destroys its powers of vegetation; it is green, with a pale longitudinal line on the back and sides. The moth appears at the end of March and April, but is not a common species. It occurs in numerous localities round London. The specimen figured is a male, with the antennæ pectinated as in O. instabilis.

SPECIES? 6.—O. (TÆNIOCAMPA) PALLIDA. PLATE XXVIII., FIG. 11.

SYNONYME.—*Noctua pallida*, Haworth; Stephens; Wood, Ind. Ent., pl. 10, fig. 176.

This supposed species seems intermediate between the preceding and following; it measures about 1½ inch in the expanse of the fore wings, which are of a uniform pale reddish-brown colour, with a reddish striga near the tip of the wings, outwardly edged with whitish-buff, preceded by a series of very indistinct punctures placed on the veins, as in the former species, which are occasionally obsolete, and another row of rather larger punctures

close to the apex, the stigmata being also encircled with a pale line; the cilia is ashy-coloured; the hind wings are more dusky, the cilia being slightly reddish. Found, but very rarely, in the neighbourhood of London. Mr. Stephens states that it closely resembles some of the varieties of O. sparsa, whilst Mr. Doubleday considers it as a variety of the following.

SPECIES 7.—O. (TÆNIOCAMPA) STABILIS. PLATE XXVIII., FIG. 1, & PLATE XXIX., FIG. 20.

SYNONYMES.—*Noctua stabilis*, Wien. Verz.; Hübner; Treitschke; Stephens; Wood, Ind. Ent., pl. 10, fig. 177.
Noctua Cerasi, Fabricius; Haworth; Albin, pl. 75, fig. a—e,
Noctua juncta, Haworth; Albin, pl. 76, fig. e—h (variety).
Noctua rufannulata, Haworth (variety).

This very common insect varies from 1¼ to 1½ inch in the expanse of the fore wings, which are of a brownish-red colour, having a greyish tinge; the strigæ at the base of the wing obsolete; the stigmata very large, and almost, and sometimes quite, touching each other, encircled with a whitish-buff line, the anterior one having an oval supplemental stigma behind it, also edged with a pale line, the hinder portion of which is, however, less conspicuous; beyond the outer stigma is a row of minute black dots placed on the veins; and beyond this, an oblique, nearly straight, pale striga, through which run the veins, which form very fine lines; close to the margin of the wing itself is also a row of minute black dots; the hind wings are brunneous grey, and shining. The antennæ of the males are far more strongly bipectinated in this species than in O. sparsa, instabilis, etc.

The varieties are very numerous; that named N. juncta by Haworth has the wings reddish-grey, with the rings surrounding the stigmata united, and a pale subapical striga (Mr. Haworth, however, mentions that the antennæ are less pectinated in this than in the type). The N. rufannulata of Haworth has the wings reddish-brown, with a subapical red striga margined externally with pale, and the stigmata separate and margined with red. In other varieties the ordinary strigæ are more distinct, and in some specimens there is a dark broad bar between the stigmata.

The caterpillar is yellowish, with three greenish-yellow longitudinal lines; it feeds on the willow, as well as on the oak, elm, cherry, etc.; and the moth appears in March and April, and is very abundant.

SPECIES 8.—O. (TÆNIOCAMPA) MINIOSA. PLATE XXVIII., FIG. 2, 3.

SYNONYMES.—*Noctua miniosa*, Wien. Verz.; Fabr.; Borkh.; Hübner; Ochs.; Treitschke; Haworth; Stephens; Wood, Ind. Ent., pl. 10, fig. 178.
Bombyx rubicosa, Esper.

This species measures from 1⅛ to 1½ inch in the expanse of the fore wings, which are pale rufescent or cinereous, with a slender red striga near the base, followed by another broad bar of the same colour, broadest towards the costa, which, however, it does not reach. It includes the ordinary stigmata, and is margined both anteriorly and posteriorly by a pale striga edged with dusky. Between this and the apical margin (especially in the females) is a striga formed of red dots upon a pale buff slightly-waved striga; the cilia is rufous-ashy. The hind wings are rosy white, with a dark lunule (more distinct in the female), and an interrupted brown stripe beyond the middle; the margin itself marked with a row of reddish lunules, the cilia dark rosy. There is some difference in the tone both of the ground-colour of the wings and of the strigæ of this handsome species. The antennæ of the males are strongly pectinated.

The caterpillar is black, with a yellow line on each side; it feeds on the oak and birch in the summer, and the moth appears in March, but is rare.

SPECIES 9.—O. (TÆNIOCAMPA) CRUDA. PLATE XXVII., FIG. 11, & PLATE XXIX., FIG. 12.

SYNONYMES.—*Noctua cruda*, Wien. Verz.; Treitschke; Stephens; Wood, Ind. Ent., pl. 10, fig. 179.
Noctua ambigua, Hübner; Duponchel; Boisduval.
Noctua pulverulenta, Esper; Borkhausen.
Bombyx nanus, Haworth; Albin, pl. 74, fig. a—e.

This dull-coloured insect is one of the smallest in the genus, measuring from 1 to 1¼ inch in the expanse of

the fore wings, which are of a plain grey colour tinged with reddish-brown, and slightly varied with minute dark atoms and small blackish spots, whereof three form a small triangle near the base of the wings; several others form a very indistinct transverse line preceding the anterior stigma, which is small and dusky-coloured, as is also the outer stigma, which is distinct, and of the ordinary size; beyond this is a minute curved row of dots, those towards the costa being the largest, followed by an indistinct pale subapical stripe, the margin itself spotted with black. The hind wings are pale brown, with almost white cilia, having a rosy tint. Varieties occur in which the ordinary strigæ are rather more distinct, and the stigmata united. The female is duller coloured. The caterpillar varies from greenish-brown to red, with yellow lines on each side, and the back irrorated with white, and the head green; it feeds on various trees, and the moth appears in March, frequenting the flowers of the sallow, and resting upon oaks. It is a very common species.

SPECIES 10.—O. (TÆNIOCAMPA) PUSILLA. PLATE XXVII., FIG. 10.

SYNONYME.—*Noctua pusilla*, Haworth; Stephens; Wood, Ind. Ent., pl. 10, fig. 180.

This species measures an inch in the expanse of the fore wings, which are of a dull grey colour, with the stigmata contiguous but obsolete, and of a brown colour, with a broad, brown, interrupted line running from the anterior stigma to the base of the wing; the apical margin marked with a row of brown punctures; the abdomen is proportionately stouter than in the last, with a great beard, having a black dot. Considered by Mr. Stephens as a variety of O. cruda; but Mr. Haworth states that the wings are more rounded or retuse in form. Taken in Richmond Park, but rare.

SECTION B.—ORTHOSIA PROPER.

SPECIES WHICH ARE AUTUMNAL IN THE TIME OF THEIR APPEARANCE IN THE PERFECT STATE.

SPECIES 11.—ORTHOSIA LITURA. PLATE XXVIII., FIG. 4.

SYNONYMES. — *Phalæna Noctua litura*, Linn.; Hübner; Fabr.; Treitschke; Stephens; Wood, Ind. Ent., pl. 10, fig. 181. Guénée (Anchocelis l.)

Noctua Polluta, Esper.
Noctua depuncta, Borkhausen (variety).
Noctua Ornatrix, Freyer (variety).

This species measures from $1\frac{1}{8}$ to $1\frac{1}{2}$ inch in the expanse of the fore wings, which are of a greyish-brown, with five black short lines or dots upon the costa, one being transverse at the base of the wing, another also forming a dot before the middle of the wing, this being united behind to a simple or geminated striga formed of reddish somewhat undulated lines; the third and fourth costal marks are opposed to the stigmata, which are brown and circled with a whitish line; the space between them and the costa being liver-coloured, which also extends backwards to the hind margin; beyond this is a broad darker brown fascia, followed by a narrow subapical one, marked on the costa by the fifth black mark, the apex of the wing itself being also darker brown. The hind wings and cilia are dark brown. The colours are occasionally much brighter than ordinary, and the stigma connected.

The caterpillar is yellowish-green, with a dark dorsal line and a pale stripe on each side, and the head pale brown; it feeds on the willow, birch, and other trees, as well as upon trefoil, etc., at the beginning of the summer; and the moth (which is rather rare, but widely distributed over the country) appears in September.

SPECIES 12.—ORTHOSIA PISTACINA. PLATE XXVIII., FIG. 5, 6, 7, 8.

SYNONYMES. — *Noctua Pistacina*, Fabr.; Hübner; Haworth; Stephens; Treitschke; Wood, Ind. Ent., pl. 10. fig. 182. Guénée (Anchocelis P.)
Noctua serina, Esper.
Noctua Lychnidis, Fabr.; Duponchel (variety).
Noctua canaria, Esper (variety).
Noctua lineola, Haworth; Donovan, 10, pl. 360, fig. 2 (variety).
Noctua Schœnobœna, Esper (variety).
Noctua sphærulatina, Haworth (variety).
Noctua rubetra, Esper (variety).
Noctua ferrea, Haworth (variety).
Noctua venosa, Haworth (variety).

This most variable insect measures from $1\frac{1}{4}$ to $1\frac{1}{2}$ inch in the expanse of the fore wings, which vary from

pale rufescent buff or stone colour to bright fulvous red, varied with grey shades. In some specimens the ordinary strigæ and other markings are almost obsolete; whilst in others they are distinct, consisting of a small blackish dot near the base of the wing, followed by an oblique striga formed of pale scallops, edged with blackish, but becoming obsolete towards the costa, which is, however, marked with two dots indicating its place. This is succeeded by the anterior stigma, which is very small, and forms an oblique blackish short line; the other stigma is much larger, but rather narrower and oblique in the opposite direction; to its inner edge is united a curved striga formed of small dark scallops, terminating in a black dot on the costa half-way below the stigmata; another black stigmal dot is placed in front of the second stigma, beyond which is a slightly-curved pale striga edged before and behind with dusky scallops, followed by another submarginal, pale, very indistinct striga, indicated by black dots and by a black patch on the costa; the extreme margin of the wing is also marked with a row of black dots. Such is the variety represented in our figure 6. Our figure 4 represents another variety, in which most of these markings may be traced, appearing, however, only in a grey shade upon the red-brown ground-colour of the wing; whilst our figure 5 represents another beautiful variety, in which the ground-colour is bright red-brown, with nearly all the markings obliterated, except those of the costa and the stigmata.

There are likewise a great number of other varieties, as indicated in the synonymes; but all these are obtained from similar larvæ, which are green, with a whitish or reddish lateral streak and pale dots: they feed on the Centaurea Scabiosa and Ranunculus bulbosus; and the moth appears in September and October, and may be taken on the flowers of the ivy, like most of the species of this division of this genus (Douglas, in Entomol., p. 66).

SPECIES 13.—ORTHOSIA HUMILIS. Plate XXVII., Fig. 7, 8.

Synonymes. — *Noctua humilis*, Fabricius; Boisduval; Hübner; Treitschke; Duponchel. | *Noctua lunosa*, Haworth; Stephens; Wood, Ind. Ent., pl. 10, fig. 183; Curtis, Brit. Ent., pl. 237.

This handsome but variable species measures from 1⅓ to 1½ inch in the expanse of the fore wings, which are slightly acuminate at the tip, and of an ochre-brown, varying to ashy-brown, with the costa and veins whitish; near the base of the wing is a pale bent striga, edged with dusky or reddish-brown; the two ordinary stigmata are distinct and rather small, dark-coloured, and encircled by a pale whitish line; a dusky striga runs from the hind part of the posterior stigma obliquely to the posterior margin of the wing, and is followed by a curved pale striga, edged with dusky both before and behind; beyond which is a row of dusky dots, those next the costa being the most elongated; and the margin is marked with a row of small dark spots; the cilia is spotted with brown. The hind wings are shining, of a yellowish or brownish-white, speckled with black, with a brown lunule in the middle, and an interrupted row of brown spots near the margin, which is, moreover, spotted with brown; the cilia ochre-coloured. Numerous varieties occur, both in the tint of the ground-colour of the wings, and in the strength of the markings, some of which are occasionally obsolete. The moth is not by any means rare, being found in the woods round London, and in various other parts of the kingdom, in September, frequenting the flowers of the ivy.

SPECIES 14.—ORTHOSIA LOTA. Plate XXVIII., Fig. 9.

Synonyme.—*Phal. Bomb. Lota*, Linn.; Fabr.; Treitschke; Hübner; Haworth; Boisduval; Stephens; Wood, Ind. Ent., pl. 10, fig. 184.

This species varies from 1¼ to 1½ inch in the expansion of the fore wings, which are of an ashy-brown colour, with several black dots on the costa, connected with pale ones indicating the origin of the ordinary strigæ, which are very obscure; a very conspicuous black dot on the hinder stigma, which, as well as the anterior, is

margined with a red line, and a very slender bright red striga towards the apical margin of the wing, outwardly edged with whitish, and angulated near the costa. The hind wings are brown. The anterior stigma is also occasionally marked with a dusky patch, as in Wood's figure, and there is also a black dot at the base of the wings.

The caterpillar is described by Fabricius as being of an ashy colour, with black and white lines, and whitish dots. It feeds upon the willow in the spring, and the moth is found in the autumn. It is rare in the woods round London, but occurs in various other parts of the country.

SPECIES 15.—ORTHOSIA UPSILON. PLATE XXVII., FIG. 12.

SYNONYMES.—*Noctua Upsilon*, Wien. Verz.; Hübner; Treitschke; Stephens; Wood, Ind. Ent., pl. 10, fig. 187. | *Noctua corticea*, Esper. *Noctua fissipuncta*, Haworth.

This species measures from 1¼ to 1½ inch in the expansion of the fore wings, which are of an ashy-brown colour, slightly clouded with darker shades; the costa interrupted with pale and dark dots indicating the origin of the ordinary strigæ, which are obsolete, except the submarginal one, which is pale and much waved, marked on the inside, particularly in the middle, with brown patches; the stigmata are concolorous, with a slightly paler margin, preceded and followed by black markings, the space between them forming a triangular patch, open in front; towards the base of the wing is a blackish dash, occasionally obsolete; and in the place of the supplemental stigma are two blackish lines, united in the middle, but becoming wider apart towards the base of the wing; along the apical margin of the wing is a row of small black dots. The hind wings are paler brown, rarely marked with a central lunule and a dusky margin. All the markings of the fore wings are, however, liable to obliteration, except the subapical pale striga, and occasionally the ground-colour is almost black. The antennæ are simple. The caterpillar is dusky brown, with pale longitudinal stripes down the back, and darker dots on the sides; it feeds under the bark of willows and poplars, and the moth appears in July (Boisduval). It is by no means a rare species in the south of England, occurring in marshy places.

SPECIES 16.—ORTHOSIA MACILENTA. PLATE XXVIII., FIG, 10.

SYNONYMES.—*Noctua macilenta*, Hubner; Ochsenheimer; Treitschke; Stephens, Ill. H., 3, p. 68 (but not the macilenta of Haworth). | *Noctua flavilinea*, Haworth; Curtis; Stephens, Ill., 2, p. 148, pl. 19, fig. 2; Wood, Ind. Ent., pl. 10, fig. 185.

This species measures about 1⅓ inch in the expansion of the fore wings, which are of a reddish ground-colour, with the ordinary strigæ very indistinct, and with the stigmata slightly distinct and rather distant, obsoletely flavescent, with a black spot on the hind part of the posterior one in most specimens, a black dot near the base of the wings, and a nearly straight subapical reddish slender streak, angulated near the costa, where it is rather more obscure and outwardly edged with a pale yellow line. The hind wings are dark brown, with the cilia reddish. The antennæ of the males are "hirto-pectinated," without elongated rays. The caterpillar feeds on plantain and chickweed, and the imago appears at the end of the autumn, but is rare; it, however, occurs in the southern part of the country, where it is widely distributed, and was also captured in Norfolk, by Mr. Burrell.

DESCRIPTION OF PLATE XXIX.

INSECTS.—Fig. 1. Mythimna turca (the double line). 2. The Caterpillar.
" Fig. 3. Mythimna conigera (the brown line bright eye). 4. The Caterpillar.
" Fig. 5. Mythimna grisea (the bright-eyed clay).
" Fig. 6. Mythimna lithargyria (the ochraceous brown). 7. The Caterpillar.
" Fig. 8. Mythimna imbecilla.

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INSECTS.—Fig. 9. Segetia Xanthographa (the square spot rustic).
" Fig. 10. Segetia neglecta (the neglected rustic).
" Fig. 11. Caradrina Plantaginis (the dotted rustic).
" Fig. 12. The Caterpillar of Orthosia cruda (ambigua, Hübner, but not of Ochsenhlimer, who describes Caradrina Plantaginis under that name).
" Fig. 13. Caradrina Morpheus (the bordered rustic). 14. The Caterpillar.
" Fig. 15. Caradrina cubicularis (the pale mottled willow).
" Fig. 16. Caradrina glareosa (the autumnal rustic).
" Fig. 17. Grammesia trilinea (the treble lines).
" Fig. 18. Grammesia bilinea (the dark treble lines).
" Fig 19. The larva of Semiophora gothica figured in plate 27.
" Fig. 20. The larva of Orthosia stabilis figured in plate 28.

PLANTS.—Fig. 21. Convolvulus arvensis (the small Bindweed).
" Fig. 22. Luzula pilosa (the hairy Rush).
" Fig. 23. Plantago major (common Plantain).

Figs. 1, 3, and 18 are from specimens in the British Museum. Fig. 6 is from the cabinet of Mr. Stephens, and 8 from Hübner's fig. Figs. 10, 11, and 13 are from specimens in the collection of Mr. Bentley. The rest are from specimens sent me by Mr. H. Doubleday. The caterpillars are from Hübner, with the exception of 19 and 20, which are drawn from nature. H. N. H.

MYTHIMNA, OCHSENHEIMER, STEPHENS.

Mr. Stephens adopts the second section of Ochsenheimer's genus Mythimna under the present name, on account of the elongated body, acute repanded anterior wings with obliterated stigmata, and simple transverse fascia-form strigæ, slightly-crested thorax, pubescent eyes, and ciliated antennæ, and æstival time of appearance of the perfect insects which he introduces into it. Both Boisduval and Guénée introduce these insects into the tribe Leucanidi or Leucanides; the latter author, indeed, uniting them into the genus Leucania, whilst Boisduval adopts the same mode of arrangement, except that he separates N. turca alone, forming it into the genus Mythimna, on account principally of the strongly-fasciculated fore feet of that species; there is also a diversity in the caterpillars which seems to warrant such a step.

SPECIES 1.—MYTHIMNA TURCA. PLATE XXIX., FIG. 1, 2.

SYNONYME.—*Phal. Noct. turca*, Linn.; Haw.; Ochs.; Treitschke; Hübner; Stephens; Wood, Ind. Ent., pl. 10, fig. 188.

This species measures about 1¾ inch in the expanse of the fore wings, which are of a greyish brown-red, the hind portion of the wings having a redder shade: thickly irrorated with minute brown atoms; there is a rather strong brown angulated striga at about one-fourth of the length of the wing from the base; at the middle of the wing is placed a small whitish lunule in the place of the outer stigma, the basal one being obsolete, half-way between which and the apical margin is a second curved brown striga; along the apical margin is a row of black dots; the hind wings are brown, paler at the base, and with the margin redder: cilia of all the wings and the abdominal tufts of hair reddish. The antennæ are very slightly ciliated.

The caterpillar is ochre-red, with the back marked with blackish dots, through the middle of which runs a whitish line; the sides are paler yellowish, with dusky markings forming longitudinal rows; it is described as feeding upon Juncus pilosus, and the moth appears in woody situations in July, but it is rare; it has occurred in Essex, Coombe Wood, and near Bristol.

SPECIES 2.—MYTHIMNA GRISEA. PLATE XXIX., FIG. 5.

SYNONYMES.—*Noctua grisea*, Fabricius; Haworth; Stephens; Wood, Ind. Ent., pl. 10, fig. 189.
Leucania Lithargyria, Boisduval.

This plain insect measures about 1½ inch in the expanse of the fore wings, which are nearly of a uniform

reddish-grey; the hind margin of the fore wings paler; the place upon the great median vein whence the branches arise is marked, near the middle of the wing, with a white spot, between which and the base, in fine specimens, is a very slightly indicated, oblique, dusky striga, and behind the white patch a small, indistinct, dusky dot; beyond the white patch is a curved row of black dots placed one on each of the veins, and occasionally beyond this is the rudiment of a very much angulated, dusky, marginal bar; the hind wings are pale brown, with the cilia of all the wings rosy-grey. The male has the abdomen with a patch of black hairs at the base, and the antennæ very slightly ciliated. The caterpillar is dark buff-coloured, with a reddish stripe down the side. It feeds on various low weeds, and the moth appears at the beginning of July; it is not very common, but occurs in various places in the south of England.

SPECIES 3.—MYTHIMNA LITHARGYRIA. Plate XXIX., Fig. 6.

Synonymes.—*Noctua Lithargyria*, Borkhausen; Hübner; Stephens; Treitschke; Wood, Ind. Ent., pl. 10, fig. 190.
Noctua ferrago, Fabricius.
Noctua punctum album, Villers.
Noctua ferruginea, Scriba.
Leucania Lithargyria (var. *Anargyria*), Boisduval.

This species measures from 13 to 17 lines in expanse of the fore wings, which are of a pale ochre-brown, more irrorated with dusky than the last species, especially at the base of the wings, with an undulated striga towards the base, followed by a slightly distinct series of dots, and an indistinct whitish patch situated in the same position as in the last, beyond which is a curved series of blackish dots placed on the veins, the ground-colour of this part of the wings being darker; the hind wings are reddish-brown, paler at the base, with reddish-grey cilia. The males have not a black tuft of hairs at the base of the abdomen beneath.

The caterpillar is pale greyish-brown, with several white slender longitudinal stripes on the back and side, the first segment with a dark scaly patch above; it feeds on the plantain. The species is rare, our drawing having been made from the collection of Mr. Stephens, who possesses both sexes. It has been found near Brockenhurst, in the New Forest, in July.

SPECIES 4.—MYTHIMNA CONIGERA. Plate XXIX., Fig. 3, 4.

Synonymes.—*Noctua conigera*, Wien. Verz.; Fabricius; Treitschke; Hübner; Haworth; Stephens; Wood, pl. 10, fig. 191.
Noctua floccida, Esper.

This species measures about 1⅓ inch in the expanse of the fore wings, which are of a yellowish-red or ferruginous buff; the ordinary stigmata are very obsolete and rather paler; a small clear white conical spot being placed at the base of the outer stigma, directed towards the body; a brown striga towards the base of the wings bent nearly at right angles, and another oblique one towards the apex of the wing, angulated near the costa; beyond this the ground-colour is paler, but the wing terminates with an irregularly-angulated brown apical margin. The hind wings are pale reddish-brown, paler at the base; the antennæ are simple.

The caterpillar resembles that of the preceding species, being of a greyish-brown colour, striped longitudinally with black and white, the back being of a redder colour, and the first segment with a black patch and three white lines. It feeds on various low-growing plants. The moth appears at the end of July, and is not rare in the woods round London; it has also occurred in Derbyshire and Yorkshire.

SPECIES 5.—MYTHIMNA IMBECILLA. Plate XXIX., Fig. 8.

Synonymes.—*Noctua imbecilla*, Hübner; Curtis, Guide; Wood, Ind. Ent., pl. 54, fig. 44.
Noctua aliena, Hübner.
N. nexa? Duponchel.

This species measures about 1¼ inch in the expanse of the fore wings, which are of a reddish-fulvous colour, with the ordinary strigæ distinct and brown, the first, towards the base of the wing, nearly straight and trans-

verse; the second very much angulated towards the costa, and curved in the middle of the wing; the space between this and the third striga is more dusky, and encloses a pale stigma having a dusky centre; the third striga is considerably curved, and the fourth, formed of small dusky crescents, runs nearly parallel with the apical margin of the wings; the hind wings are brown, paler at the base, with the ciliæ of all the wings fulvous.

Introduced as British by Mr. Curtis into his Guide, but considered by Mr. Stephens as dubious. The antennæ of the males are pectinated, whence, as well as from its general habit and markings, it seems scarcely referable to the present group. M. Guénée has given it as the single species of his genus Mythimna (Ann. Soc. Ent. de France, 1841, p. 237), whilst Boisduval unites it with nictitans, Linn., and connexa, Borkh., as an aberrant section ("an gen. proprium") of his genus Luperina.

SEGETIA, Stephens, Boisduval.

The antennæ of the males are dentato-ciliated, and those of the females but slightly ciliated; the palpi are porrected in front of the eyes, but rather short; the terminal joint distinct, but not quite so long as the hairs on the preceding joint; the eyes naked; the thorax is rounded, not crested; the wings rather short; the apical margin rather truncate and entire; the two stigmata pale and distinct. The caterpillars are cylindrical, of a grey colour, with dark longitudinal stripes; they feed by night upon low herbs and grasses; the perfect insects appear in the autumn.

SPECIES 1.—SEGETIA XANTHOGRAPHA. Plate XXIX., Fig. 9.

Synonymes.—*Noctua Xanthographa*, Wien. Verz.; Fabr.; Treitschke; Duponchel; Hübner; Stephens; Wood, Ind. Ent., pl. 10, fig. 194.
Noctua tetragona, Haworth.

This species measures from 1¼ to 1½ inch in the expanse of the fore wings, which are of a pale brown colour, with a reddish tinge: fine specimens have two undulated or elbowed brown strigæ before the middle of the wing. The two stigmata are distinct and luteous, the first small and oblique, the second large and square; beyond these is an arched pectinated striga, or a curved row of black dots, and there is a subapical pale striga but slightly conspicuous, rather undulated; the ciliæ are brown; the hind wings are whitish-buff, with the margin brownish, and whitish ciliæ. There is considerable variation in the depth of colour of the markings, which are sometimes indistinct.

The caterpillar is dusky yellow, with a pale line on each side, and black dots and lines behind. The perfect insect is very abundant, and appears in August; "the larvæ feed through the winter," Curtis.

SPECIES 2.—SEGETIA NEGLECTA. Plate XXIX., Fig. 10.

Synonyme.—*Noctua neglecta*, Hübner; Treitschke; Haworth; Stephens, Ill. Haust., 2, pl. 21, fig. 1; Wood, Ind. Ent., pl. 10, fig. 195.

This species is considerably larger than the preceding, measuring 1⅝ to 1¾ inch in the expanse of the fore wings, which are of a dull ashy colour, slightly irrorated with dusky dots, some of which seem to represent the ordinary strigæ, the third of which, beyond the stigmata, consists of a curved row of more distinct dots placed upon the veins. The fore stigma is almost obliterated, but the outer one is more distinct, pale, and encloses a dusky spot; nearly parallel with the apical margin runs a dusky striga, having a pale external margin; the hind wings are brown, with the base and cilia pale.

Taken in the woods in Kent, and in the New Forest, in September, by Messrs. Chant and Bentley.

CARADRINA, Ochsenheimer.

The species of this group, as restricted by Stephens, may be known by the slenderness of their bodies, glossiness of their entire wings, marked with distinct stigmata, the antennæ simple in both sexes; the palpi have the terminal joint distinct, but very short; but what more particularly distinguishes the species is the habit of the caterpillars, which are mostly short, depressed above with small heads; each end of the body being attenuated and often rugose, with numerous small black tubercles, from each of which is emitted a short stiff bristle, often directed backwards. They hide themselves by day, and feed by night upon low herbs. They descend beneath the surface of the earth to undergo their transformations.

SPECIES 1.—CARADRINA PLANTAGINIS. Plate XXIX., Fig. 11.

Synonymes.—*Noctua Plantaginis*, Hübner; Duponchel; Boisduval.
Noctua ambigua? Fabricius? Treitschke? Wien. Verz.
Caradrina ambigua, Stephens; Wood, Ind. Ent., pl. 10, fig. 196.
Noctua Xanthographa, Haworth.
Noctua redacta, Haworth (variety); Wood, Ind Ent., pl. 11, fig. 197.
Noctua egens, Haworth (variety).
Noctua blanda, Ochsenheimer, nec Hübner.
Noctua Alsines (variety); Wood, Ind. Ent., pl. 11, fig. 198.
Caradrina implexa,* Stephens (variety); Wood, Ind. Ent., pl. 11, fig. 199.
Noctua lævis, Haworth? (variety); Wood, Ind. Ent., pl. 11, fig. 200.
Noctua sordida, Haworth (variety).

Guided by the great practical knowledge of Mr. Bentley, we here reduce all the supposed species indicated in the synonymes given above to one extremely variable species, a step which nothing short of the direct observations which that gentleman has published would have induced us to adopt; inasmuch as Boisduval acknowledges four of these species, and Stephens, in his Catalogue, indicates that there are at least two distinct species, namely, ambigua and Alsines. As there is a doubt as to the former of these species, we have followed Boisduval in employing the name Plantaginis in its stead. This species is distinguished from the others in the genus by having the body stou and the thorax broad; the colour of the fore wings (which generally expand about 1¼ inch) is very variable, but generally of a greyish-brown tint, with the two basal strigæ not very distinct, and formed of dark dots; the stigmata distinct, with a striga between them rather darker than the ground-colour of the wings, and rather small and distinct, the basal one round, and the other kidney-shaped, with a slender, pale margin; beyond this stigma is a curved pale striga, marked internally with black dots; and beyond this a pale angulated striga running outside a dusky stripe; the margin itself with black dots; the hind wings whitish, with a dusky margin. Such is a description of the typical individuals. We extract the following characters of the chief varieties of this species from Mr. Bentley's article on the genus, recently published in the Entomologist.

The variety *redacta* is smaller than the last, with the stigmata and markings more indistinct.

Alsines has the anterior wings fuscous, with two transverse strigæ; the posterior stigma large, and distinctly margined with white.

Implexa has the anterior wings rusty, or yellowish, with four fuscous, transverse strigæ; the posterior striga rather more undulated.

Lævis† resembles *Alsines*, but the stigma is scarcely visible.

Sordida is rusty, or reddish, with two transverse fuscous strigæ approximating towards the inner margin; posterior margin clothed with black. These and various other varieties described by Mr. Bentley, which have

* Mr. Curtis states that the Noctua implexa of Hübner is an Apamæa.

† Mr. Curtis states that he possesses Plasted's specimen of Noctua lævis, Hübn., described by Haworth; and that it is certainly not a variety of Alsines, being closely allied to Segetia neglecta; neither is it Wood's figure 200. It was taken in July, near Darenth Wood.

not been named, but which form so many links connecting the supposed species together, differ in no one essential specific character, either in antennæ, palpi, tibiæ, or tarsi.

The caterpillar varies from ashy-grey with reddish lateral lines, to ferruginous varied with brown, and a brown head. It feeds on low plants. The moths frequent woods, hedges, and gardens, and the more ordinary varieties are by no means rare.

SPECIES 2.—CARADRINA MORPHEUS. Plate XXIX., Fig. 13, 14.

Synonymes.—*Noctua Morpheus*, Vieweg; Treitschke; Stephens; Boisduval; Wood, Ind. Ent., pl. 11, fig. 201.
Noctua Sepii, Hübner; Haworth; Stephens; Wood, Ind. Ent., pl. 11, fig. 202.
Noctua radica, Esper?
Noctua pulla, Beckwith, in Linn. Trans., 2, pl. 1, fig. 7, 9?

This species measures about 1¼ inch in the expansion of the fore wings, which are of a pale greyish-brown, with a shining gloss; the markings indistinct, the costa varied with numerous short, dusky, oblique spots, a transverse striga close to the base of the wings, a second, much waved, preceding the basal stigma, which, as well as the other, are dusky and rather wide apart, the space between them is darker; beyond the outer stigma runs a slender much-curved row of dots, and beyond this a rather broad, irregular, dusky bar, succeeded by a paler streak; the margin itself dusky, and marked with a row of blackish dots. The hind wings pale whitish-buff, having a black dot in the middle, towards the costa, on the under side. "Varieties darker in colour, and clouded or spotted with deep fuscous or black, are generally called Morpheus," which is considered identical with Sepii by Bentley and Boisduval. Mr. Stephens, however, considered his specimen of Morpheus as distinct, on account of its differing in its pale ochraceous or flavescent ash-colour from all the specimens he had seen of Sepii.

The caterpillar is of a reddish-brown colour, with a pale dorsal line and obscure lateral streaks. The larvæ, as described by Beckwith, has the back and belly of a pale livid colour; and along the middle of the back is a row of white rhomboidal spots; the sides dark brown, with the lower extremity edged with a white line; he describes it as lying concealed at the roots of willows during the day, and ascending the trees to feed on the leaves at night. This description seems applicable to the present species, of which the caterpillar is said to feed on the wild convolvulus. The perfect insect is very common, and appears in June.

SPECIES 3.—CARADRINA CUBICULARIS. Plate XXIX., Fig. 15.

Synonymes.—*Noctua cubicularis*, Hübner; Haworth; Treitschke; Boisduval; Stephens; Wood, Ind. Ent., pl. 11, fig. 203.
Noctua segetum, Esper.
Noctua 4-punctata, Fabricius; Stewart.
Noctua superstes, Haworth; Stephens; Wood, Ind. Ent., pl. 11, fig. 204.
Caradrina superstes, Treitschke?
Noctua blanda, Haworth; Hübner? Duponchel? Boisduval?

This small species varies from 1 to 1¼ inch in the expanse of the fore wings, which are of a pale greyish brown-buff, with four black dots on the costa, indicating the origin of the ordinary strigæ, the two basal ones of which are very slender and very much dentated; the basal stigma is very indistinct, marked by a slightly fulvous speck. Between this and the outer stigma is a very indistinct series of dark arches; the outer stigma is fulvous, but rather indistinct, with a blackish patch at its base, marked with two minute specks, followed by a much-curved row of delicate black arches, the apical portion of the wing being varied with brown, pale luteous buff, and reddish-brown, forming several indistinct and irregular fasciæ. The apical margin itself is dotted with black; the hind wings white, with a pearly tinge; the margin slightly brown; beneath they have a dusky fascia running from the costa; and the margin is dotted with small black marks. This species is liable to considerable variation, both in the distinctness of the strigæ and in the extent of the reddish-brown markings near the apex of the wings. Mr. Bentley states that large and dark varieties are generally named Superstes in

British collections, but are mere varieties of Cubicularis. The Blanda of Hübner, which is given by Stephens, Curtis, and Boisduval as identical with Superstes of Ochsenheimer, is, however, considered by these authors as distinct. It is doubtful, however, whether Mr. Haworth's Blanda be identical with the species so named by Hübner.

The caterpillar of Cubicularis is of a pale grey colour, each segment marked on the back with several dark brown conical spots, the points directed towards the head. Mr. Curtis states that he has found the caterpillars in January under the bark of willows. In March 1837, Mr. Raddon communicated to me some, which had been found in very great numbers in unloading a rick of wheat, upon which they were feeding, at Ham Green, the seat of Richard Bright, Esq.; they were found in all parts of the stack. Dr. Calvert also lately exhibited some probably similar caterpillars to the Entomological Society, which had proved very destructive in wheat-fields, by ascending the stalks and eating the grain. The moths appear in June and July, and are very common.

SPECIES 4.—CARADRINA GLAREOSA. Plate XXIX., Fig. 16.

Synonymes.—*Noctua glareosa*, Esper; Ochsenheimer? Treitschke? Stephens, Ill. H., 2, pl. 21, fig. 1; Wood, Ind. Ent., pl. 11, fig. 205.
Noctua margaritacea, Borkhausen.
Noctua I-geminum, Duponchel.
Orthosia Hebraica, Hübner; Boisduval; Curtis.

This pretty species measures about 1¼ inch in the expanse of the fore wings, which are of a pale ashy colour, tinged with purplish rufescence, and powdered with fine black irrorations; close to the base of the wing is a short black striga, formed of two dots placed transversely; near the basal stigma is another interrupted black fascia, formed of three dots, the middle one being the largest, and triangular; the stigmata are almost concolorous with the rest of the wing; they are of large size, with a rather paler edge. The space between them occupied by a black patch, rather dilated in front; beyond this are two pale strigæ, the first edged with reddish-brown. The hind wings are pearly, tinted with light ochre.

Very rare; found at Birch Wood, in the New Forest, and Devonshire, in September. It is questionable whether this species is correctly located in the present genus. I have also added marks of interrogation to Ochsenheimer's and Borkhausen's names quoted in the synonymes.

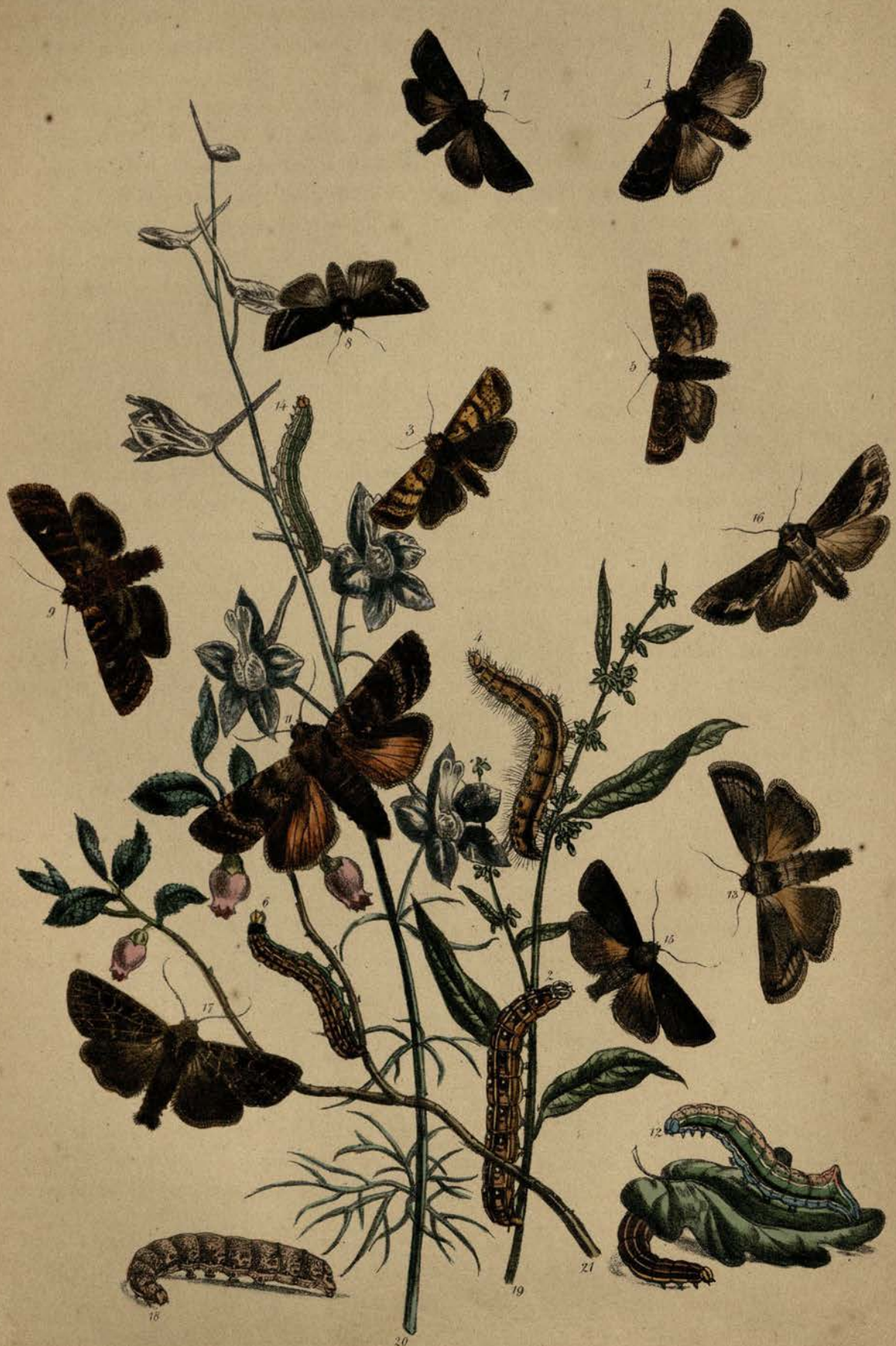
GRAMMESIA, Stephens.

This little group has been separated by Mr. Stephens from the genus Caradrina (of which it is considered as a distinct section by Boisduval) on account of the serrated antennæ of the males, the stoutness of the body, and plain obscure transversely lineated wings; by which latter character they may be distinguished from Segetia, whilst their obtuse anterior wings and woolly thorax separate them from Mythimna. The caterpillars are described by Guénée as being short and almost onisciform.

SPECIES 1.—GRAMMESIA TRILINEA. Plate XXIX., Fig. 17.

Synonymes.—*Noctua trigrammica*, Esper.
Noctua trilinea, Wien. Verz.; Hübner; Treitschke; Haworth; Stephens; Curtis; Wood, Ind. Ent., pl. 10, fig. 192.
Noctua quercus, Fabricius.
Noctua evidens, Thunberg.
Noctua approximans, Haworth (variety).
Noctua semifuscans, Haworth (variety).

This species varies from 1¼ to nearly 1½ inch in the expanse of the fore wings, which are of a pale hoary grey-buff, with four darker, narrow, nearly straight strigæ placed at nearly equal distances, the basal one being abbreviated and close to the base of the wing, the second straight, the third rather curved towards the costa as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well as the fourth; the apical margin and cilia rather darker; the stigmata are obsolete. The hind wings brown, with grey cilia.

The variety named Approximans by Haworth has the basal striga obsolete, and the two outer strigæ approximating towards each other on the hind margin of the wing; whilst the variety named Semifuscans by Haworth has the basal half of the fore wing rufous grey, and the apical half dark rufous brown, and the second striga thickened.

The caterpillar is ashy-grey, with pale stripes along the sides. It feeds on the plantain, and is full-grown in October. The moth occurs in various of the woods round London, and in Devonshire and Cumberland, etc., at the end of June and beginning of September; it is not a very uncommon species.

SPECIES 2.—GRAMMESIA BILINEA. PLATE XXIX., FIG. 18.

SYNONYMES.—*Noctua bilinea*, Hübner; Haworth; Treitschke; Boisduval; Curtis, Brit. Ent., pl. 651 (Caradrina b.); Stephens; Wood, Ind. Ent., pl. 10, fig. 193.

This species measures rather more than $1\frac{1}{3}$ inch in the expanse of the fore wings, which are of a dark grey-brown, with three straight transverse dark strigæ running across the wings, and margined with luteous, the basal one abbreviated; there is also another very indistinct brown striga running across the middle of the wing through an obscure ear-shaped spot. The hind wings are pale brown, with the cilia and extremity of the body ochre-coloured. Found in June and July in various distant localities in the south of England, but certainly a rare species.

DESCRIPTION OF PLATE XXX.

INSECTS.—Fig. 1. Glæa? Rubricosa (the red chestnut). 2. The Caterpillar.
" Fig. 3. Dasycampa Rubiginea (the dotted chestnut). 4. The Caterpillar.
" Fig. 5. Glæa Vaccinii (the chestnut). 6. The Caterpillar.
" Fig. 7. Glæa Subnigra (the black chestnut). 8. A variety.
" Fig. 9. Mecoptera Satellitia (the satellite). The Caterpillar is represented at the right hand of the foot of the Plate, crawling from beneath a leaf.
" Fig. 11. Amphipyra Pyramidea (the copper underwing). 12. The Caterpillar.
" Fig. 13. Pyrophila Tragopoginis (the mouse). 14. The Caterpillar.
" Fig. 15. Pyrophila Tetra (the mahogany).
" Fig. 16. Dypterigia Pinastri (the bird's wing).
" Fig. 17. Lemuris Typica (the dark gothic). 18. The Caterpillar.

PLANTS.—Fig. 19. Rumex Acutus (the sharp-leaved Dock).
" Fig. 20. Delphinium Consolida (the field Larkspur).
" Fig. 21. Vaccinium Myrtillus (the Bilberry).

Figs. 8, 12, and 15 are from specimens in the British Museum, and fig. 3 is from a specimen in the cabinet of Mr. Bentley; the others are all from specimens sent to me by Mr. H. Doubleday. The caterpillars are all from Hübner, with the exception of 11 from an original drawing by Standish, in the British Museum, and 17 from a specimen sent me by Mr. Doubleday. H. N. H.

DASYCAMPA, GUÉNÉE, BOISDUVAL. GLÆA, STEPHENS. OMALOSOMA, GUÉNÉE (*Olim*).

The curious species upon which recent French Lepidopterists have proposed this genus is at once distinguished by its caterpillar, which is entirely covered with silky hairs, and without oblique lateral lines; the head is small; it feeds on low plants; the cocoon is placed on the surface of the ground; the body of the perfect insect is very much depressed in both sexes, terminating squarely, that of the female being but little narrowed. The antennæ are rather thick and crenulated in the males; the palpi not porrected before the frontal tuft. The fore wings are marked with numerous irregular spots on a bright yellow ground, clouded with reddish-brown.

SPECIES 1.—DASYCAMPA RUBIGINEA. Plate XXX., Fig. 3, 4.

Synonymes.—*Noctua rubiginea*, Wien. Verz.; Fabricius; Hübner; Haworth; Stephens; Wood, Ind. Ent., pl. 11, fig. 207; Boisduval; Guénée; Treitschke.

Noctua tigrina, Esper.
Noctua sulphurago, Borkhausen (variety).

This species measures about 1⅛ inch in the expansion of the fore wings, which, as well as the thorax, are of a rich, orange-yellow colour; the former clouded with rusty red undulated strigæ, especially across the middle, and with numerous small brown dots; the stigmata are not very distinct, the outer one being marked with a larger darker spot on its hinder part; the hind wings are brownish-black, with fulvous cilia. The caterpillar is brown and hairy, with black dots along the back. Rare, but taken at Bromsgrove by Mr. Morris, and in Norbury Park by J. Walton, Esq., in October, 1833.

GLÆA, Hübner; Steph. CERASTIS, Ochs.; Boisd.; Guénée.

As here restricted this genus is characterised by the flattened bodies of the perfect insects, which have the antennæ slender and setaceous, covered with scales above, pubescent beneath, each joint producing a few fine bristles; the palpi short, with the apical joint very minute, scarcely porrected beyond the frontal tuft; the abdomen truncated at the tip, and the fore wings also truncated at the tip, with the hinder angle rounded. When at rest they lie flat, one being partially placed upon the other. The caterpillars are smooth, cylindrical, thick, and velvety, with the stigmal line distinct. They feed upon low plants by night; the perfect insects appear at the end of the autumn.

Mr. Curtis adopted this genus in the extent proposed by Mr. Stephens, namely, including rubricosa, rubiginea, and satellitia, observing, in opposition to that author, on the "pernicious practice of giving everything a generic name which does not strictly accord with the type," it frequently happening "that the first and last species are as nearly related to other genera as to that in which they are included." Mr. Curtis, however, subsequently saw that this practice was not quite so pernicious as he once deemed it, for, in a subsequent part of his work, he separated his *last* species, satellitia, as a distinct genus, whilst rubiginea and even, perhaps, rubricosa have no greater right to retain their situation in the genus.

SPECIES 1.—GLÆA VACCINII. Plate XXX., Fig. 5, 6.

Synonymes.—*Phal. Noct. Vaccinii*, Linnæus; Hübner; Haworth; Boisduval; Stephens; Wood, Ind. Ent., pl. 11, fig. 209; Albin., pl. 23, fig. 34, e—h.

Noctua polita, Hübner; Haworth (variety).
Noctua ligula, Esper (variety).
Noctua spadicea, Haworth; Hübner? (variety).

This is a very variable species, measuring about or rather more than 1¼ inch on the expanse of the fore wings, which have a shining appearance, which gives the greyer parts a bloom. The ground-colour of the fore wings is dark red-brown, the apical portion more tinged with orange; near the base of the wing is a small short transverse grey striga, another more curved preceding the stigmata, and a third, beyond the outer stigma, much undulated; the chief veins are also greyish; the stigmata are orange with a darker centre, the outer one black behind; parallel with the apex is a submarginal dark striga preceded by a row of small reddish-brown punctures, and the extreme margin is varied with small conical darker patches; the under wings are tawny-grey, with reddish fulvous cilia. The species varies, however, very greatly in the colours of the fore wings, some being almost uniform reddish-brown, and others much darker.

Guided by the great practical knowledge of Mr. H. Doubleday, respecting this tribe of insects (see Entomologist, p. 262), we have given the dark chestnut (Noct. spadicea, Haworth) and netted chestnut (N. polita)

as varieties of this species. Mr. Stephens (Illustr. Haust. Supplement, vol. iv., p. 389) indeed, as well as Boisduval, had entertained the same opinion; but Mr. Doubleday specifically separates the subnigra, next described. The variety named Polita is described by Haworth as very similar to Vaccinii, but with the wings browner, with the strigæ and veins reticulated with ashy scales, whilst Spadicea is described by Haworth as having the fore wings of a nearly uniform subcastaneous colour, very slightly clouded with brown, the costa near the tip with a few small whitish dots. The true Spadicea is, however, as I believe, identical with the following species. (See Guénée, in Ann. Soc. Ent. de France for 1841, p. 234). The caterpillar is reddish-brown, with a pale lateral line, the first segment black, with white stripes; the belly pale greenish. It feeds on the bilberry and whortleberry, bramble, etc., and the moth appears in September, October, and November, hybernating and appearing again in the spring. It is an abundant species.

SPECIES 2.—GLÆA SUBNIGRA. Plate XXX., Fig. 7, 8.

Synonymes.—*Noct. subnigra*, Haworth; Stephens; Curtis, Brit. Ent., pl. 268; Wood, Ind. Ent., pl. 11, fig. 211.
Noct. spadicea, Hübner? (nec Haworth); Guénée, in Ann. Soc. Ent. France, 1841, p. 243.

This species is rather smaller than the preceding, measuring $1\frac{1}{4}$ inch in the expanse of the fore wings, which are of a chestnut black colour and shining, some specimens having nearly all the markings obliterated, as in our figure 7, except the black patch in the outer stigma, and a row of reddish lunulated spots, but very indistinct towards the apical margin. Mr. Haworth's description and Mr. Curtis's figure represent a strong variety in which the two basal strigæ are more distinct, the stigmata reddish, followed by a pale undulated much-curved striga, several minute white dots on the costa, and a pale ochre subapical bar with six or seven ferruginous spots. But the chief character of the species appears to consist in the different form of the fore wings, which have the apex more produced and pointed. The hind wings are ochreous-brown, with a darker fascia and the cilia ochre. It is a comparatively rare species, which appears in the perfect state later in the season than G. Vaccinii. The caterpillar feeds on the honeysuckle, according to Mr. H. Doubleday.

SPECIES 3.—GLÆA ? RUBRICOSA. Plate XXX., Fig. 1, 2.

Synonymes.—*Noctua rubricosa*, Wien. Verz.; Fabr.; Hübner; Treitschke; Stephens (Glæa r.); Boisduval (Orthosia r.); Guénée (Tæniocampa r.); Wood, Ind. Ent., pl. 11, fig. 206.
Noctua rufa, Hatchett; Haworth.
Noctua mucida, Esper.
Noctua pilicornis, Borkhausen.
Noctua mista, Hübner (variety).

This interesting species measures nearly $1\frac{1}{2}$ inch in the expanse of the fore wings, which are of a deep chestnut red, and very glossy; the costa paler, with several small dark brown spots at the origin of the strigæ, which are but slightly indicated, and rather paler than the rest of the wing; the apex of the costa, on the other hand, is of the same colour as the rest of the wing, with several minute white dots; the stigmata are present, but rather indistinct, the outer one with a dusky patch behind. The hind wings are reddish-brown, with reddish cilia. The abdomen is not depressed, as in the other species, and the antennæ are more hairy beneath; a character which, together with the very different habit of the caterpillar, has induced recent French Lepidopterists to remove it from the preceding species of Glæa, from which it also differs in the more oblique truncation of the extremity of the fore wings. The caterpillar is grey, with a browish dorsal line, and two white spots on each segment; it is smooth and cylindrical. It feeds on Rumex acutus, and the moth, unlike the two preceding species, appears at the end of March, frequenting banks of nettles, but it is a rare species. Boisduval places the species in Orthosia, and Guénée in Tæniocampa, with which latter the vernal period of the perfect state agrees.

MECOPTERA, Guénée. SCOPELOSOMA, Curtis. CERASTIS, b. Boisduval.

Like the typical Glææ, the type of this genus has the body depressed, but the fore wings are longer and more oblique at the tips, and are likewise dentated. The palpi are very short, with the terminal joint concealed beneath the scales. The antennæ are setaceous, each joint producing spreading hairs beneath in the males. The curious character observed by Mr. Curtis, of two tufts of long hairs at the base of the abdomen beneath, is not, as he supposes, peculiar to the type of this genus; it is figured from another species in Kirby and Spence, vol. iv. pl. 29, fig. 21; and other instances are mentioned in my Modern Class. of Ins., vol. ii. p. 395. It is, I believe, peculiar to the males. Hence, as well as from the hybrid nature of Mr. Curtis's generic name, I have rejected it in favour of M. Guénée's name, Mecoptera, proposed about the same time. The caterpillar when young resides on the elm and other trees, but when older it descends the tree and feeds upon low plants adjacent; it will also devour other caterpillars when placed together in a box.

SPECIES 1.—MECOPTERA SATELLITIA. Plate XXX., Fig. 9.

Synonymes.—*Phal. Noct. Satellitia*, Linn.; Fab.; Hübner; Haworth; Donovan, vol. 5, pl. 168; Stephens; Curtis, Brit. Ent., pl. 635; Wood, Ind. Ent., pl. 11, fig. 208. *Noctua transversa*, Hufnagle.

This species measures about 1½ inch in the expanse of the fore wings, which are of a reddish-chestnut colour, with cloudings of a richer colour; a slender angulated dark striga is near the base of the wings, followed by a nearly straight one; beyond this is a dusky wave, on the outside of which is placed a small, somewhat triangular white dot, accompanied by a speck of the same colour at each of its outer angles; these vary in colour from white to yellow, and even brown, and are succeeded by a waved striga, between which and the apex of the wings are several alternate paler and darker arched undulations. The hind wings are brown, with pale cilia. The moth appears in the autumn, from September to November, and the caterpillars are nearly black, with several paler longitudinal streaks, and the belly brownish-buff, the first segment striated with pale colour. (It is represented crawling from beneath a leaf, at the foot of our 30th plate.) They vary, however, to green or yellowish-orange, with a pale dot and a white lateral line above the feet. It is not a very common species, but occurs in various parts of the south of England.

AMPHIPYRA, Ochsenheimer. PHILOPYRA, a. Guénée.

This and several allied genera form a very distinct group amongst the Noctuidæ, characterised by their recurved palpi, corresponding with the extended genus Amphipyra, of Ochsenheimer, a name which Mr. Stephens has restricted to the Noctua pyramidea, of Linnæus, which was, however, placed by Ochsenheimer amongst his less typical species, his type being N. Tragopoginis; hence has arisen some confusion in the works of Stephens, Boisduval, and Guénée. N. pyramidea is characterised by having the palpi recurved upwards as high as the top of the eyes, with the terminal joint long and acute; the antennæ slender, and but slightly ciliated; the abdomen depressed, conical, and tufted; the fore wings dentate at the tip, with the disk varied in its markings, and the hind wings bright-coloured. The caterpillar feeds upon the leaves of forest trees, and is of handsome appearance as to its colours, with a conical protuberance near the extremity of the body.

SPECIES 1.—AMPHIPYRA PYRAMIDEA. PLATE XXX., FIG. 11, 12.

SYNONYMES.—*Phal. Noctua pyramidea*, Linnæus? Fabr.; Treitschke; Hübner; Donovan, vol. 6, pl. 193; Stephens; Wood, Ind. Ent., pl. 11, fig. 213.

This species varies from 1⅔ to 2 inches in the expanse of the fore wings, which are of a brown colour, much varied with pale greyish-brown; near the base of the wing is a small angulated pale striga, edged with black, and another similarly edged and very dentated before the anterior stigma, which is small, pale, and round, with a black dot in the centre, followed by a large dark patch extending nearly to the costa, where are two blackish spots; then follows another very irregular, pale, undulated striga, edged with black, and a dark subapical bar, emitting pointed longitudinal streaks, directed towards the base of the wing, and a row of minute, apical, curved dark lines. The hind wings are bronzed red, with the costal portion broad and brown. The body is brown. The caterpillar is naked and green, with white dorsal and lateral lines, and a conical protuberance near the extremity of the body. It feeds on oak, elm, poplar, hazel, nut, plum, and other trees, in May and June, and the moth appears in August; it is fond of hiding itself in crevices, or burrows in the bark of the oak, formed by other insects, where it sits with its shining eyes only exposed at the entrance. It is a rather common and widely-distributed species.

PYROPHILA, STEPHENS, HÜBNER, P. (SCOTOPHILA, BOISDUVAL. PHILOPYRA, G. GUÉNÉE.)

This group is closely allied to the preceding, but differs in having the terminal joint of the recurved and velvety palpi short; the fore wings are almost destitute of markings, with the apex not dentated; the hind wings are pale coppery-brown, all the wings being very glossy. The antennæ are elongate, slender, and setaceous. The caterpillars are green, with white lines, but without the angular elevation at the extremity of the body. They feed on various low-growing plants, and the moths appear at the middle and end of the summer.

SPECIES 1.—PYROPHILA TRAGOPOGINIS. PLATE XXX., FIG. 13, 14.

SYNONYMES.—*Phal. Noct. Tragopoginis*, Linn; Haworth; Hübner; Wood, Ind. Ent., pl. 11, fig. 214.

This species measures about 1¼ inch in the expanse of the fore wings, which are entirely of a brown mouse-colour, with no other markings than a dusky spot in the place of the anterior stigma, two others in the place of the outer stigma, and a very ill-defined subapical striga. The hind wings are livid brown, with the margin darker. The caterpillar is green, with a white line on the back and two on each side, and various white dots on each segment. It feeds on Tragopogon pratense, Spinacea oleracea, Serratula arvensis, etc., in May and June, and the moth appears in July and August. On one occasion I found a considerable number hidden beneath the bark of a rotten tree, at Netley, Salop; and M. De Villiers has noticed them in such situations ranged side by side, generally touching each other, with the head always turned in the same direction, and which if disturbed do not attempt to fly, but run upon the backs of their companions, which exhibit no marks of alarm.*

SPECIES 2.—PYROPHILA TETRA. PLATE XXX., FIG. 15.

SYNONYMES.—*Noctua tetra*, Fabricius; Haworth; Hübner; Treitschke. | *Ph. tragopoginis*, Donovan, 7, pl. 223, f. 2? Albin, pl. 27, fig. 41, h—k; Wood, Ind. Ent., pl. 11, fig. 215.

This species is described as rather larger than the preceding (17 lines broad); the fore wings dark brown, with three dark spots placed as in Tragopoginis, and with several small white dots on the costa; near the apex and the

* Ann. Soc Ent. de France, xi. Bull. p. xii.

hind wings darker livid brown, with the margin brown. Mr. H. Doubleday (Entomol., p. 262) considers this and the preceding species identical. As, however, the two species are given distinct by all the Continental authors, I have retained it, considering it, however, probable that as Tetra is described as a more southern species, it is doubtful whether the insects so called in England may not be dark varieties of Tragopoginis. The moth appears in July and August.

LEMURIS, Hübner. NÆNIA, Stephens. MANIA, p. Treitschke, Boisd., Guénée.

The type of this curious group is distinguished at once by the structure of the palpi from all its congeners, they being very large and advanced in front of the head, and bent upwards; the basal joints very thickly clothed with long scales, whilst the terminal joint is long, slender, and exposed, so as to cause the palpi to appear cleft. The thorax and abdominal segments are strongly tufted, and the abdomen is bearded at the extremity. The wings have the apical margins notched. The caterpillars are naked, with the anal segment slightly elevated; they feed on various low herbs, as well as on willow, etc., and the pupa is enclosed in a very slight cocoon of earth, found at a considerable depth under ground; the pupa itself is very glossy. Most recent Continental authors have united Noctua maura, Linn., in the same genus as N. typica, which Mr. Stephens considers very unnatural. The observations of M. Guénée upon the subject, however (Ann. Soc. Ent. de France, 1838, p. 112), are calculated to shake the correctness of such a decision. It is in respect to the structure of the palpi and the differences in the pupa state that I have not followed the Continental authors in uniting the two species in the same genus.

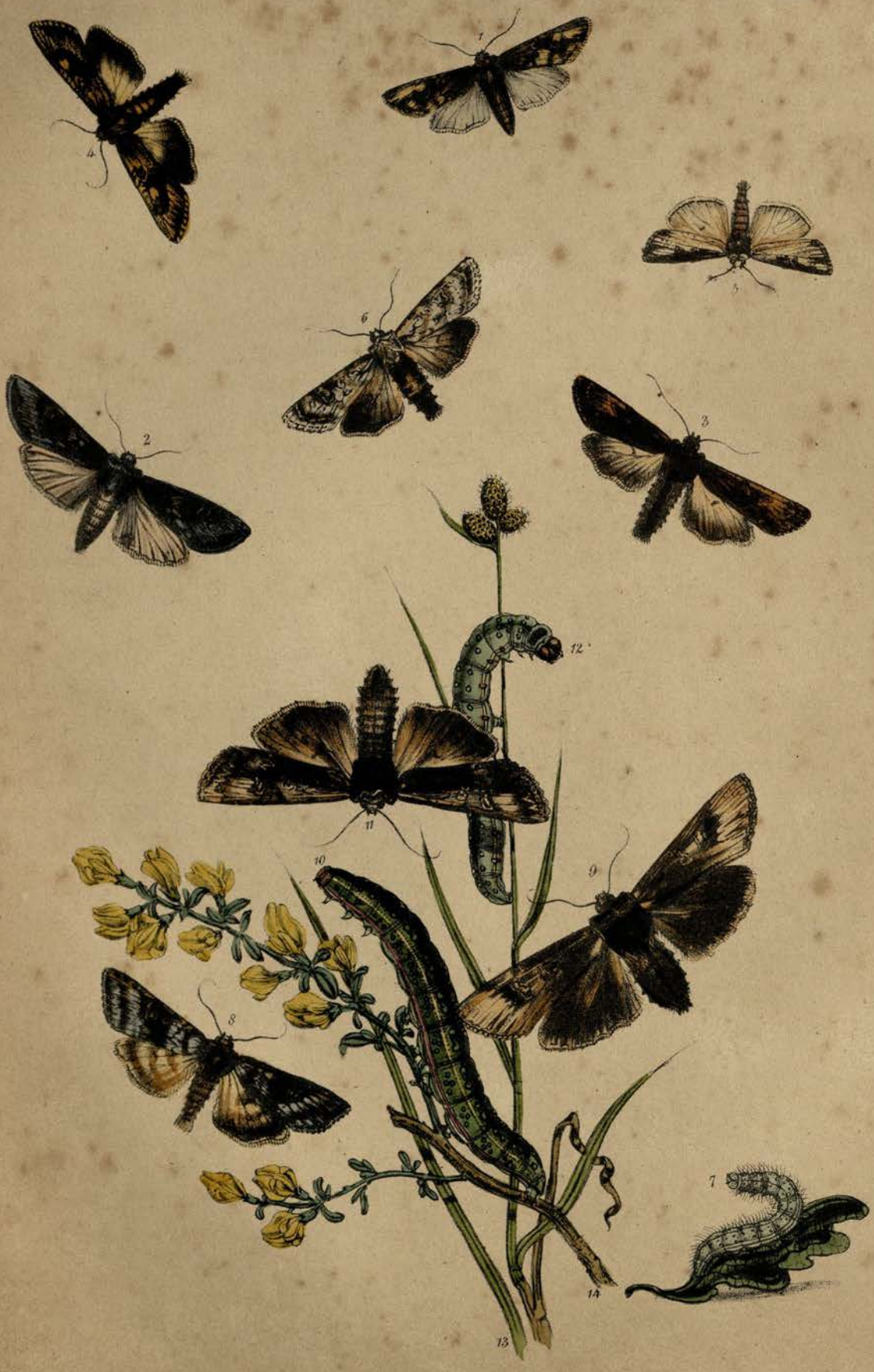
SPECIES 1.—LEMURIS TYPICA. Plate XXX., Fig. 17, 18.

Synonymes.—*Phal. Noct. typica*, Linn.; Fab.; Haworth, Albin, pl. 15, fig. 21, a—d; Harris, Aurelian, pl. 22, fig. d—g. | *Noctua venosa*, Hübner. *Noctua excusa*, Esper.

This common species varies from $1\frac{1}{2}$ to $1\frac{5}{6}$ inch in the expanse of the fore wings, which are of a shining dark brown colour, reticulated with buffish-white; the costa marked with numerous dark and light alternating patches; the longitudinal veins also pale buff-white, as well as the strigæ, of which one preceding the stigmata is nearly transverse, and edged with black; the extreme margin is marked with a row of triangular black dots; the hind wings are dark brown, with paler cilia. The caterpillar is excellently figured by Moses Harris, and is of a grey-brown colour, the under parts of the body paler, and with lateral oblique pale lines, the twelfth segment angulated above; they are found in the beginning of April at the roots of nettles, or the bottoms of the stalks of winter celery which grows on banks. They are full-fed in May, when they make a cocoon on the surface of the ground, according to Harris, and the moth appears in June and July. It is very common, flying over banks of nettles.

DYPTERIGIA, Stephens. LUPERINA †††† p. Bdv. CLOANTHA, p. Guénée.

Mr. Stephens, the founder of this genus (which has not, however, been adopted abroad), separates the typical species from Xylina, Calocampa, and Xylophasia, by its highly-crested thorax, slender, nearly vertical palpi, with the terminal joint considerably exposed, and when denuded, elongate-linear, subacute; abbreviated, subtriangular ovate, tristigmatiferous fore wings, and other less obvious characters, as well as its dissimilarity in the larva and pupa states. Many of these characters will also separate it from the preceding genera.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SPECIES 1.—DYPTERIGIA PINASTRI. Plate XXX., Fig. 16.

Synonymes.—*Phal. Noctua Pinastri*, Linn.; Hübner; Haworth; Stephens; Wood, Ind. Ent., pl. 12, fig. 217; Donovan, 11, pl. 347, fig. 2. *Noctua Dypterygia*, Hufnagle.

This species measures nearly 1½ inch in the expansion of the fore wings, which are black or blackish-brown, with the three stigmata indicated by darker edges; the costa with darker dots, indicating the place of the strigæ, and several minute white ones near the tips; the inner margin of the wing is pale ashy-brown, as well as a large, irregular, subapical patch, somewhat resembling a bird's wing expanded, near the angle of the fore wings, edged within with black, and with several black subapical dashes; the hind wings are brown, with the margin broad and darker. The caterpillar is dark brown, with blackish dots, with two pale longitudinal lines and several oblique lateral ones. It feeds on various species of Rumex, and the moth appears in May and June. It is rather rare, occurring in places where pines abound.

DESCRIPTION OF PLATE XXXI.

Insects.—Fig. 1. Xylina conspicillaris (the silver cloud).
" Fig. 2. Xylina pulla (the ash shoulder knot).
" Fig. 3. Xylina semibrunnea (the tawny pinion).
" Fig. 4. Xylina petrificata (the pale pinion).
" Fig. 5. Xylina putris (the flame).
" Fig. 6. Xylina Lambda (the grey shoulder knot). 7. The Caterpillar.
" Fig. 8. Lithomia solidaginis (the golden-rod brindle).
" Fig. 9. Calocampa exoleta (the sword-grass). 10. The Caterpillar.
" Fig. 11. Calocampa vetusta (the red sword-grass). 12. The Caterpillar.

Plants.—Fig. 13. Carex Vahlii (the close-headed Alpine Carex).
" Fig. 14. Genista pilosa (hairy greenweed).

Figures 1, 2, and 4 are from specimens in the British Museum; the others are all from specimens sent to me by Mr. H. Doubleday. The caterpillars are from Hübner. H. N. H.

XYLINA, Treitschke.

This group, as restricted by Mr. Stephens, is distinguished by the quadrate thorax; the short, nearly horizontal palpi, with the terminal joint more or less exposed; the antennæ simple or but very slightly serrated in the males; the eyes naked, except in X. conspicillaris; the fore wings rather long and narrow, with the tips obsoletely dentated; and the caterpillar naked, or but slightly pilose. The group is, however, by no means so natural as could be wished, since Putris and Lambda have respectively a very different habit from the others, Semibrunnea, for example; which last possesses a much stronger resemblance to the Calocampæ; in fact, N. putris, Linn., is given by Boisduval as an Agrotis, and Conspicillaris as a Luperina; whilst Mr. Curtis, who, in 1829, united the Calocampæ, Xylinæ, and Dypterigiæ into one group (Brit. Ent., 256), separated a portion under the name of Rhizolitha, in 1833 (Ent. Mag., i. 186).

SPECIES 1.—XYLINA LAMBDA. Plate XXXI., Fig. 6.

Synonymes.—*Noctua Lambda*, Fab.? Haworth; Stephens; Wood, Ind. Ent., pl. 11, fig. 219. | *Rhizolitha Lambda*, Curtis, Ent. Mag., No. 2, 189. *Noctua rhizolitha*, Fab.? Hübner; Godart; Curtis.

This species measures from 1½ to 1⅔ inch in the expanse of the fore wings, which are of a very pale greyish-white, with numerous small blackish dots on the costa, chiefly placed in pairs; near the base of the wing is a

rather curved, black, longitudinal line, dilated at the extremity, and connected with a slightly-visible oval, darkish ring preceding the stigmata, which are almost obsolete; the outer one, as well as the supplemental stigma, indicated by a short, dark, curved line behind: beyond the stigmata are several very ill-defined rows of dots and marks, and there is a row of small, black, apical dots; the cilia pale grey dotted with brown; the hind wings brown, with grey cilia; head and body clothed with grey hairs. The caterpillar is clothed with short hairs, and is green, with a white lateral line and dots, and a bluish dorsal one. It feeds on the oak, and the moth, which is not very common, appears in September and March.

Note.—Fabricius speaks of a black lunule in front of the thorax of his N. rhizolitha, which does not accord with our insect.

SPECIES 2.—XYLINA PULLA. PLATE XXXI., FIG. 2.

SYNONYME.—*Noctua pulla*, Wien. Verz.; Hübner; Ochsenheimer; Stephens; Wood, Ind. Ent., pl. 11, fig. 220.

This species measures 1⅝ inch in the expanse of the fore wings, which are of a dark ashy-grey colour, with dark lines; a darker patch towards the base is followed by a pale ashy space, enclosing the angulated stigma; the supplemental stigma is also indicated by a pale grey angulated spot, and the outer stigma is edged with the same colour; there is also a rather broad submarginal pale stripe, intersected by blackish lines and white specks, and the margin of the wing itself is also irregularly black; the hind wings pale grey, with the veins dark. We believe this species to be unique as British in the collection of the British Museum, having been captured at Woodside, near Epping, in 1817. The caterpillar is described as green, with white spots and lateral lines. The moth appears in the autumn.

SPECIES 3.—XYLINA PUTRIS. PLATE XXXI., FIG. 5.

SYNONYMES.—*Ph. Noct. putris*, Linn.; Treitschke; Godart; Haworth; Curtis; Stephens; Wood, Ind. Ent., pl. 11, fig. 223; Albin, pl. 79, fig. a—d.

Noctua lignosa, Hübner.
Phalæna subcorticalis, Hufnagle.

This species measures from 1¼ to nearly 1½ inch in the expansion of the fore wings, the anterior or costal portion of which is dark brown, varied with pale buff, whilst the hinder portion, as well as the hind wings, is pale buff and shining. A slender, dark longitudinal line, edged with buff on both sides, runs from the base. The ordinary stigmata are dark brown and edged with buff, but they are rather indistinct. From the outer one runs a geminated, dark brown striga, dilated to the margin of the wing, passing through a double row of small punctures. There is also a brown spot at the anal angle of these wings, and the cilia is spotted with brown; the edge of the hind wings is also dotted with brown; the front of the head and thorax is pale buff, the latter followed by a dark arcuated bar, forming a strong tuft. The caterpillar is described as yellowish-brown, with black spots and pale yellowish stripes, and a yellow line along the back, It feeds on grasses, and the moth, which is very common, appears in June.

SPECIES 4.—XYLINA CONSPICILLARIS. PLATE XXXI., FIG. 1.

SYNONYMES.—*Phal. Noct. conspicillaris*, Linn.; Ochsenheimer; Haworth; Hübner; Stephens; Wood, Ind. Ent., pl. 11, fig. 218.
Phal. Noct. leuconota, Donovan, vol. xiii. pl. 453, fig. 3.

This species measures 1½ inch, or rather more, in the expanse of the fore wings, which are varied with brown and ashy, and obsoletely striated; the three ordinary stigmata are distinct, the anterior being annuliform and dark, with a dingy pupil; the posterior one large and reniform, but ill defined; the third club-shaped; all, however, being only indicated by their pale edgings: the anal, or inner margin of the wing is greyish, and

more or less varied with a buff edging, which is united to an interrupted oblique striga, reaching nearly to the apex of the costa. Between the outer stigma and the margin of the wing are several black dashes, above which, in some specimens, is an oblong patch of buff, as in our figure. The hind wings are snow-white, with the veins and slender hind margin blackish; the cilia white. Varieties occur, in which the wings are much more saturated in their colouring. Of these, the individual figured by Mr. Wood differs materially from our figure. Mr. Stephens, in his Catalogue, gave one of these varieties as the Ph. N. perspicillaris of Linnæus; he, however, referred it, in his Illustrations (under No. 6183 instead of 6182), to a variety of this species, remarking also in the latter work (vol. iii. p. 94), that the Linnæan species was probably a species of Calophasia, and that he believed it was contained in Mr. Swainson's cabinet.* The eyes in this species are pubescent, and the male antennæ subserrated. The species thus forms a distinct section, and indeed, as above mentioned, it forms a distinct section in the genus Luperina of Boisduval,† who gives April as the time of its appearance in the perfect state; whilst our English authors mention the end of May. It is a very rare species, but has occurred in Bulstrode Park, and near Birch Wood in Kent. The caterpillar is dirty green, with a pale lateral line edged with brown. It feeds on Astragalus, Onobrychis, etc.

SPECIES 5.—XYLINA SEMIBRUNNEA. PLATE XXXI., FIG. 3.

SYNONYME.—*Noctua semibrunnea*, Haworth; Stephens, Ill. H., 2, pl. 21, fig. 3; Wood, Ind. Ent., pl. 11, fig. 221.

This species measures 1½ inch in the expanse of the fore wings, which are remarkably long and narrow, the anterior or costal division being of an ashy-brown colour, and the hinder division dark brunneous; they are slightly clouded with darker tints, especially in the region of the stigmata, all three of which are present, but very indistinct; the veins are dotted with black, and near the apex of the wing they are striped with thin black lines; towards the inner margin, however, these stripes become much broader, and are interrupted towards the anal angle; the apical margin is marked by a row of deeply-angulated dark spots; the hind wings are paler and shiny, with the base and cilia pale, and with a dusky central lunule; the abdomen has a row of blackish tufts down the middle; the wings beneath are paler, with a dark spot on the middle of each. This is a rare species, but has been taken at Coombe Wood, and also at Mickleham, in October, by Mr. Douglas, from the flowers of the ivy.

SPECIES 6.—XYLINA PETRIFICATA. PLATE XXXI., FIG. 4.

SYNONYMES.—*Noctua petrificata*, Wien. Verz.; Fabr.; Ochs.; Treit.; Steph.; Ill. Haust., 2, pl. 23, fig. 6; Wood, Ind. Ent., pl. 11, fig. 222.

Noctua petrificosa, Hübner.
Noctua umbrosa, Esper.
Noctua socia, Hufnagle.

This species, which has been confused with the preceding, measures 1⅝ inch in the expanse of the fore wings, which are of a greyish-ochre colour, with darker clouds, with a dark longitudinal stripe towards the base, and another behind the stigmata, which are pale ochre-coloured, the space between them being dark; the costa is marked with several blackish dots; beyond the stigmata is a double curved row of dots, and beyond these a series of dark cuneated marks, forming an angulated striga, emitting several paler streaks; the margin itself is dotted with brown; the hind wings are brown, with the base paler, and a subcentral row of obscure dots on the veins; the abdomen is ochre-coloured, without the dark tufts. Very rare, but taken in Devonshire by Captain Blomer and Mr. Marshall, as also in Norbury Park by Mr. Walton, in September.

* Boisduval gives N. perspicillaris as one of the three species of his genus Cloantha. Mr. Paget has taken it at Yarmouth.

† Guénée unites it, with Pinastri, into a section of his extended genus Cloantha.

CALOCAMPA, Stephens, Guénée.

This genus is very closely allied to such of the preceding species as X. semibrunnea, which have elongated wings, which is peculiarly the case in the present group; the peculiarly quadrate thorax, with the lateral anterior angles produced, is also a character they possess in common, although not represented by Mr. Curtis in his delineation of the type of the group, which he unites with the other Xylinæ. The antennæ are robust and ciliated with hairs beneath in the males, and the labial palpi have the terminal joint short and not exposed. The fore wings have the cilia somewhat dentated. The caterpillars are smooth, very much elongated, and varied with gay colours, and they feed upon various low-growing plants. They descend to a considerable depth into the earth to undergo their transformations. The perfect insects are autumnal.

SPECIES 1.—CALOCAMPA EXOLETA. Plate XXXI., Fig. 9, 10.

Synonyme.—*Phal. Noct. exoleta*, Linn.; Hübner; Boisduval; Haworth; Stephens; Donovan, 6, pl. 187 (larva). Curtis, Brit. Ent., pl. 266; Wilkes, 8, pl. 18.

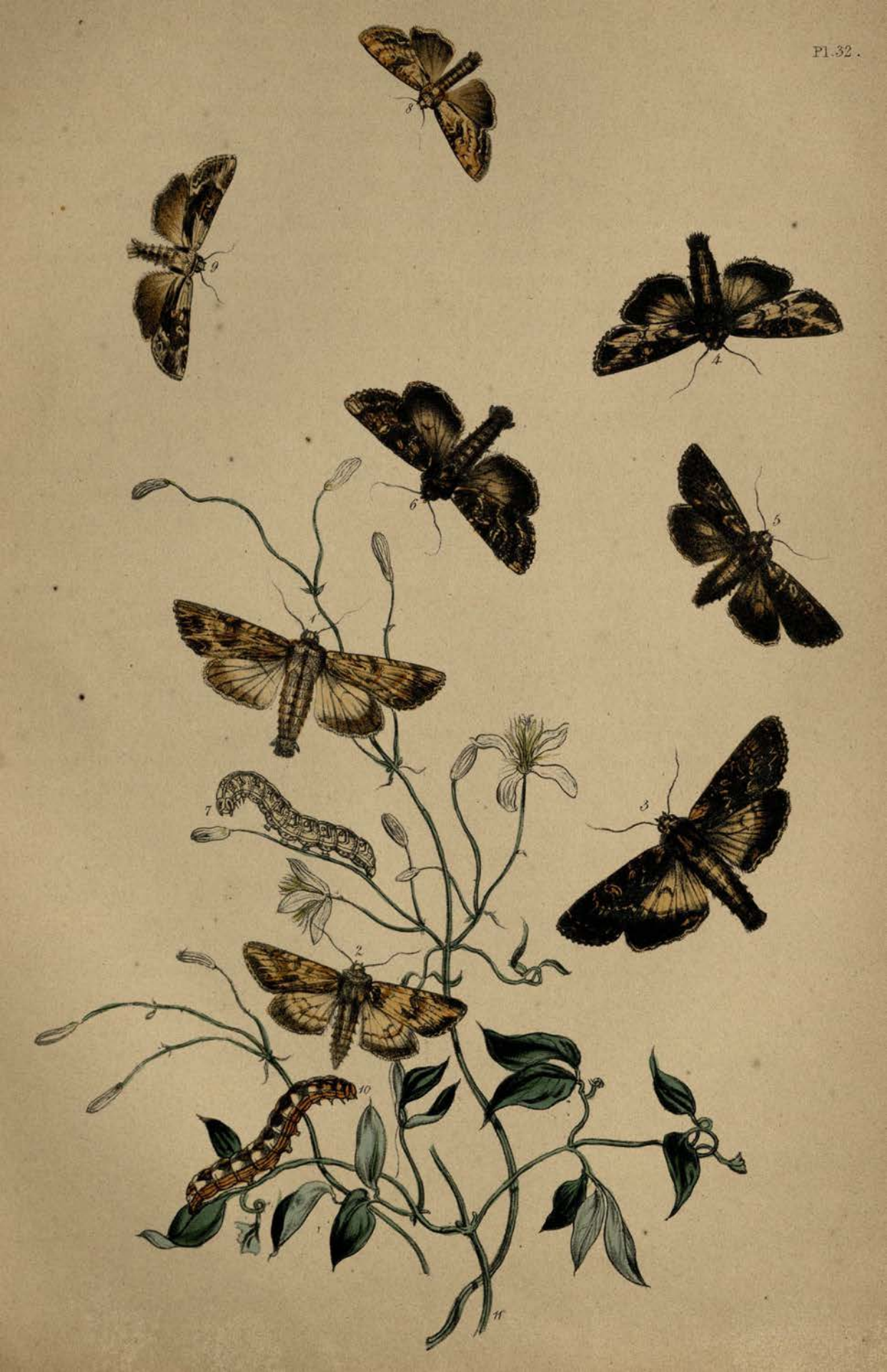
This fine species measures from 2 to 2¼ inches in the expanse of the fore wings, which have the anterior or costal portion brown, the inner portion grey or ashy-brown, and the apical portion more buff. Towards the base are numerous very slender black pencilled lines, forming various zig-zags, and which are in effect the ordinary basal strigæ singularly displaced;* the stigmata are near together, towards the middle of the wing they are but slightly indicated by a dark, slender, marginal line; the posterior, however, has a dark patch on its hinder part; annexed to this are several wedge-like dark streaks, and between these and the apical margin are one or more arrow-headed slender marks, and a double row of small black dots placed on the veins, the margin itself marked with conical dusky dots; the hind wings are greyish-brown, with a darker lunule towards the base; the margin with a row of small dark dots, and the cilia pale ochre. The front of the thorax is pale ochre, with two dark arches between the base of the fore wings, and the hind part of the thorax dark brown-grey. The caterpillar is green, dotted with white, with a yellow lateral line and a red one above the feet on each side. It feeds on various low plants, especially the Iris and Serratula tinctoria, and the moth appears at the close of the autumn as well as at the beginning of summer. It is a comparatively rare but widely-dispersed species.

SPECIES 2.—CALOCAMPA VETUSTA. Plate XXXI., Fig. 11, 12.

Synonymes.—*Noctua vetusta*, Hübner; Treitschke; Duponchel; Boisduval; Stephens.
N. exoleta, Donovan, vol. 6, pl. 187 (imago); Esper.

This species is very closely allied to the preceding, measuring rather more or less than 2 inches in the expanse of the fore wings, which are of a richer tone than in that species; the anterior stigma is almost obsolete, and the outer one accompanied by a single black dot; the inner margin of the wing darker brown, and the apex of the wing with more strongly-marked, zig-zag, pale and dark streaks. The caterpillar is dark green, spotted with white, with a pale lateral line, in which are placed the spiracles, which are red. It feeds on Carex. Rare. Darenth Wood, at the beginning of September.

* It would be an interesting object of inquiry to trace the manner in which the typical markings of this extensive family become modified or lost as we approach the confines of the group.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LITHOMIA, Hübner. (CLOANTHA, A. Guénée; XYLINA, P., Bdv.)

This genus has the antennæ of the males furnished with short brushes of hair on each side beneath; the palpi have the terminal joint slightly exposed at the tip; the fore wings are long and narrow, and when at rest are closely deflexed; the thorax subquadrate, but not tufted in front. The caterpillars are smooth and cylindrical, with the penultimate segment angularly elevated above. It feeds on Vaccinium Vitis Idæa, and the perfect insect appears at the beginning of the autumn.

SPECIES 1.—LITHOMIA SOLIDAGINIS. Plate XXXI., Fig. 8.

Synonyme.—*Noctua solidaginis*, Hübner; Treitschke; Duponchel; Curtis, Brit. Ent., pl. 683; Wood, Ind. Ent., pl. 52, fig. 1667.

This species measures nearly $1\frac{3}{4}$ inch in the expanse of the fore wings, which are of a light grey colour, with several black lines towards the base; the central part dark brown, edged with two dentated black lines; in the place of the anterior stigma are two small, round, grey dots, placed obliquely, and the outer stigma is large, ear-shaped, and pale grey margined with black; beyond this is a grey dentated line, emitting several long, arrow-like, wedge-shaped black dashes, and the margin slightly spotted with brown; the hind wings pale brown, with a yellowish tinge; the base whiter, with a faint central bar; the tippets and frontal lobe of the thorax edged with black. The caterpillar is reddish-brown, irrorated with dusky, and with a few whitish dots on each segment, and a pale yellow line on each side edged with black. The moth appears in August and September, and has been taken in Lancashire at a place called the Brushes, about two miles beyond Staley Bridge, near Manchester, where they occurred in abundance in 1837.

DESCRIPTION OF PLATE XXXII.

Insects.—Fig. 1. Xylophasis lithoxylea (the light arches).
" Fig. 2. Xylophasia sublustris (the reddish light arches).
" Fig. 3. Xylophasia polyodon (the dark arches).
" Fig. 4. Xylophasia rurea (the clouded bordered brindle).
" Fig. 5. Xylophasia combusta (the dark tawny).
" Fig. 6. Xylophasia characterea (the clouded brindle). 7. The Caterpillar.
" Fig. 8. Xylophasia scolopacina (the slender clouded brindle).
" Fig. 9. Xylophasia rectilinea (the clouded brocade). 10. The Caterpillar.

Plant.—Fig. 11. Clematis vitalba (Hedge clematis, or Traveller's joy).

The whole of the above insects are figured from specimens sent to me by Mr. H. Doubleday, with the exception of X. scolopacina, from Continental specimens in the British Museum, and X. rectilinea, from the unique specimen in the cabinet of Mr. Marshall. The caterpillars are from Hübner. H. N. H.

XYLOPHASIA, Stephens. (LUPERINA, P. Boisduval.)

This genus, although united with Xylina by Curtis and various other authors, is abundantly distinguished from that genus, not only in its perfect, but also much more in its preparatory states; indeed, by recent French writers the two groups are very widely separated in their classifications of this difficult family. The antennæ of the males are scarcely ciliated, whilst they are simple in the females; the palpi are of considerable size and bent

upwards, with the terminal joint exposed; the thorax is crested in front, the crest being bifid, the abdomen is elongated, with each segment carinated, the apex with a tuft in the males. The fore wings are somewhat triangular, with the apical margin sinuato-dentate. When at rest, they are deflexed at the sides of the body. The caterpillars are cylindric and shining, often with verrucose shining warts; they feed either on the roots or leaves of low-growing plants, amongst which they conceal themselves; and the pupæ are subterranean, either without or but with a very slight cocoon.

SPECIES 1.—XYLOPHASIA LITHOXYLEA. Plate XXXII., Fig. 1.

Synonymes.—*Noctua lithoxylea*, Wien. Verz.; Fabr.; Haworth; Bdv.; Godart, pl. 111, fig. 5; Wood, Ind. Ent., pl. 11, fig. 225.
Noctua sublustris, var., Esper, pl. 133, fig. 2.

This species measures from $1\frac{3}{4}$ to nearly 2 inches in the expanse of the fore wings, which, as well as the body, are of pale ochre, or buffish-white, the costa with several dark oblique dots, one of which, near the centre, is dilated into a dark patch, between the stigmata; the principal veins are marked towards the base of the wings with two dark punctures, and there is an irregular slender line running from the base of the wing, and another interrupted one at the base of the inner margin; the stigmata are obsolete, the supplemental one being replaced by a dark patch, bordered by a blackish hooked line; beyond this are a double row of black punctures on the veins, placed obliquely, and succeeded by several acutely-angled lines, forming several successive dentate strigæ. The ground-colour of the wings, near the anal angle and towards the tip, is of a brownish tint; the hind wings have a slight central lunule and a rather broad dusky ill-defined subapical bar, and the veins dark-coloured, the margin of the wing punctured. The tufts of the thorax and abdomen are tipped with brown. The caterpillar is green, with white dots and lines at the sides of the body. The moth is a common and widely-dispersed species, which appears in July, frequenting hedges and gardens.

SPECIES 2.—XYLOPHASIA SUBLUSTRIS. Plate XXXII., Fig. 2.

Synonymes.—*Noctua musicalis?* Esper; Godart, pl. 113, fig. 1.
Noctua lithoxylea, Hübner.
Noctua sublustris, Esper, pl. 133, fig. 1; Stephens; Wood, Ind. Ent., pl. 11, fig. 227.

This species bears a strong resemblance to the preceding, but is rather smaller, redder coloured, without the dark double arched line in front of the thoracic tuft, and with a dark narrow band across the hind wings beyond the middle. The fore wings likewise appear comparatively broader, the veins of the hind wings are scarcely coloured darker than the rest of the wings; there is also a more distinct central dusky lunule, and the abdominal tufts are not tipped with brown. In other respects the two species are very similar; all the wings on the under side have a dusky transverse strigæ. Mr. Curtis gives this as the Musicalis of Esper, which Boisduval considers as a variety of Lithoxylea: Mr. Stephens, however, has sufficiently disproved this citation. The species is very rare, having, I believe, only occurred near Brighton.

SPECIES 2.—XYLOPHASIA POLYODON. Plate XXXII., Fig. 3.

Synonymes.—*Ph. Noct. polyodon*, Linn.; Haworth; Boisduval; Stephens; Wood, Ind. Ent., pl. 11, fig. 228.
Noctua radicea, Wien. Verz.; Fabr.; Hübner.
Noctua occulta, Esper.

This species measures rather more or less than 2 inches in the expanse of the fore wings, which are of a brown colour, more or less mottled with lighter or darker tints; the costa is marked with several dusky patches, indicating the origin of the strigæ, being arranged in pairs. At the base of the wing are two longitudinal black

streaks and a considerably dentated pale strigæ, edged with darker brown preceding the anterior stigma, which is oval and very obliquely placed, edged with a black line, as is also the posterior stigma, which is broadly ear-shaped: behind these is a dark patch, terminated before and behind by an angulated pale line, being portion of the strigæ preceding and following the stigmata, the hinder of these strigæ being considerably undulated, the veins being in this part of the wing marked with black dots, between which run several acute black longitudinal streaks, arising upon a very irregular dentated and undulated whitish subapical striga, part of which resembles the letter W; the margin of the wing is marked with a series of triangular dark dots, followed by a slender wavy whitish line at the base of the cilia, which is dotted with brown. The hind wings have a slight central lunule, a broad dark border, in which is a pale marginal streak towards the anal angle: the thorax is transversely and longitudinally streaked with dark brown. Varieties occur in the intensity of the ground-colour and markings of the wings. The caterpillar is ashy-coloured, with elevated black specks, and a black head and tail; it is found under stones and at the root of grass. The perfect insect appears in June and July, and is a very abundant species.

SPECIES 4.—XYLOPHASIA RUREA. PLATE XXXII., FIG. 4.

SYNONYMES.—*Noctua rurea*, Fabr.; Steph. Ill.; Treitschke; Godart; Wood, Ind. Ent.
Noctua hepatica, Haworth; Wood, Ind. Ent., pl. 11, fig. 229 (but not of Linnæus).
Noctua putris, Hübner.
Xylina borealis, Curtis, B. E. 256, without description (variety?).

This species measures from $1\frac{1}{2}$ to $1\frac{3}{4}$ inch in the expanse of the fore wings, which are of a dingy buffish colour, much mottled with grey and reddish-brown, especially towards the costa. The stigmata are almost obsolete, the space between them being more deeply coloured. There is a dark longitudinal striga towards the base of the wings, behind and beyond the stigmata a row of minute dots on the veins, which are more distinctly marked with black at the tip, and there is a somewhat conical patch of red brown at the anal angle and towards the middle of the apical margin, which is, moreover, marked with a double row of small black lunules; the hind wings are uniform greyish-brown, with luteous cilia. All the wings on the under side have a dark central lunule, from which, in the hind wings, proceeds a dark line towards the base of the wings, and the main veins are marked with a dark dot beyond the middle of the wings. Varieties occur with the ground-colour of the fore wings bright ochre-red, with the stigmata distinct. This is a common species, which appears at the middle of the summer. As Mr. Curtis gives the putris of Hübner as probably identical with his Xylina borealis, and as Boisduval gives putris as a variety of Rurea, Mr. Curtis's insect is probably a variety of this species, which is probably also the case with X. combusta and characterea.

SPECIES 5.—XYLOPHASIA COMBUSTA. PLATE XXXII., FIG. 5.

SYNONYMES.—*Noctua combusta*, Hübner; Haworth; Steph. Ill.; Wood, Ind. Ent., pl. 11, fig. 230.
Noctua alopecurus, Esper.
Noctua luculenta, Esper.

This species measures nearly $1\frac{3}{4}$ inch in the expanse of the fore wings, which are of a dull rusty-brown colour, with several pale and darker marks along the costa, and several whitish spots at the tip; the stigmata are ill defined, but edged with a paler luteous margin, especially the outer one; the veins are dark, with minute luteous scales scattered upon them, the veins at the tip of the wings being blackish; there is a dash of darker brown along the inner edge of the wing at the base, and a triangular patch at the anal angle; the abdomen and hind wings are nearly uniform dusky-brown, the latter marked beneath as in the preceding species, of which this is probably an extreme variety. Found in June, in the woods of Kent and Surrey.

SPECIES 6.—XYLOPHASIA CHARACTEREA. PLATE XXXII., FIG. 6, 7.

SYNONYMES.—*Noctua characterea*, Hübner; Curtis. *Noctua hepatica?* Wien. Verz.; Treitschke; Duponchel; Boisduval. *Noctua Epomidion*, Haworth; Stephens; Wood, Ind. Ent., pl. 11. fig. 231.

This species measures about 1½ inch in the expanse of the fore wings, of which the ground-colour is a greyish-buff, mottled with brown and purplish clouds; the costa and base of the wings spotted as in the adjacent species; the anterior stigma very oblique and marked with black on both sides, the space between this and the outer stigma dark mottled-brown, the outer stigma large, round, and pale, followed by a pale striga edged with slender undulated brown arches, the veins with black dots, and a subapical pale luteous striga, very much angled towards the middle and waved at the anal angle, edged within with dark brown, the space between it and the apex of the wing much mottled. A rare but widely-dispersed species, being found in Derbyshire, Yorkshire, Surrey, Devonshire. The caterpillar figured by Hübner is of a reddish-buff colour, with dorsal and lateral yellow lines and spots.

Note.—It is impossible to determine what Mr. Haworth intended for his Noctua hirticornis, the Hairy-horned Brindle, the specimens having been destroyed. Mr. Haworth's short character is "spirilinguis cristata, alis glaucescentibus: fascia abbreviata terminalique plicata, antennis hirto-pectinatis." From the latter character one is almost tempted to believe the insects must have been mended with false antennæ.

SPECIES 7.—XYLOPHASIA SCOLOPACINA. PLATE XXXII., FIG. 8.

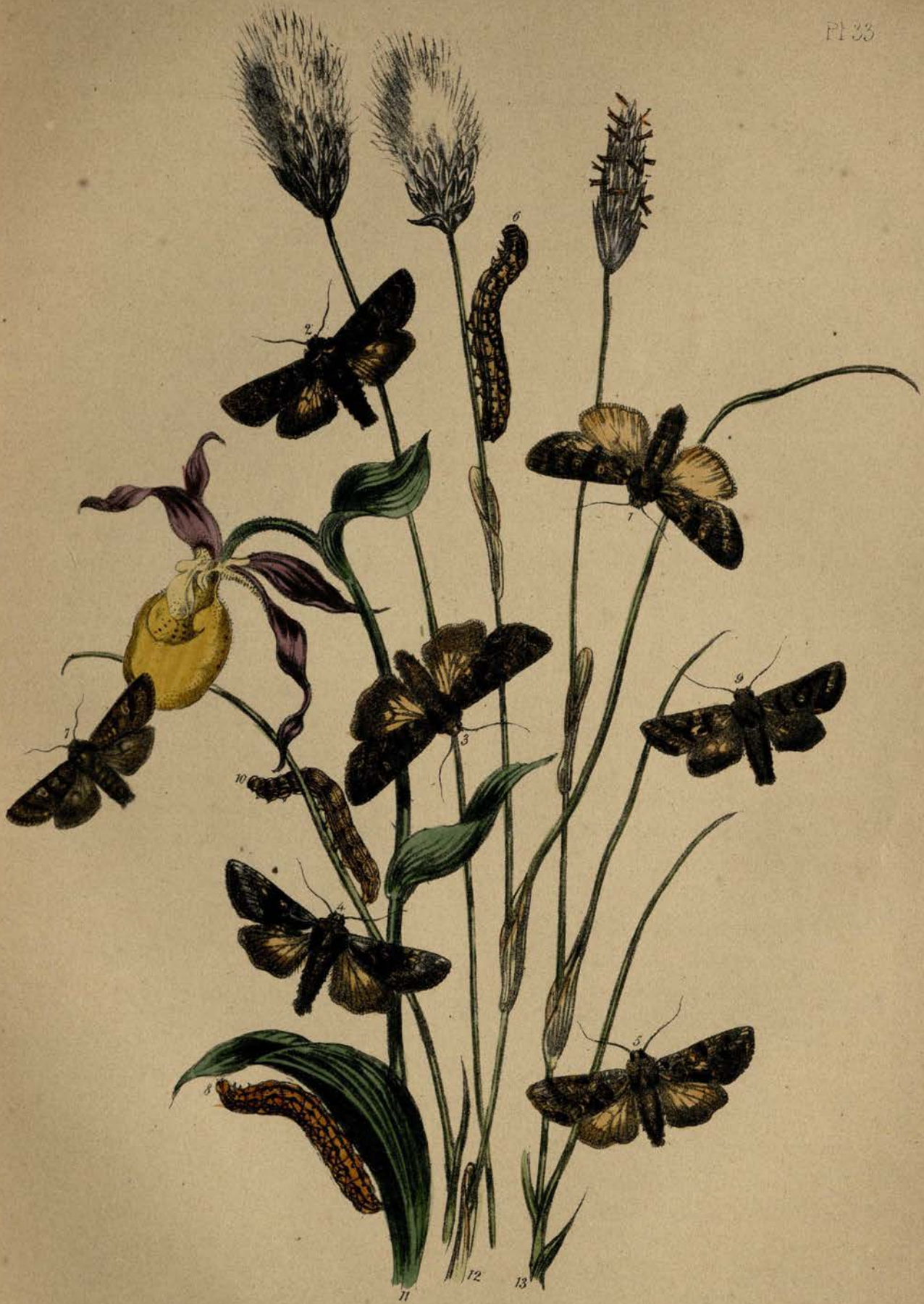
SYNONYMES.—*Noctua scolopacina*, Esper; Hübner; Treitschke; Boisduval; Stephens; Wood, Ind. Ent., pl. 11, fig. 232.
Noctua abbreviata, Haworth.

This species measures 1¼ inch in the expanse of the fore wings, which are varied with grey and brown or livery clay, with a black stripe at the base on the inner margin, a much abbreviated and not very well-defined brownish fascia, in the middle of the costa, which is marked with various dark dots. The ordinary stigmata are somewhat obsolete, the outer one being whitish, with a grey lunule; and beyond this is a slender blackish dentated streak, beyond which is a broader brunneous striga nearer the posterior margin, slightly undulated, the apical portion being rusty-brown, with black dashes and several pale dots united into an undulated streak. The cilia red-brown. The hind wings dusky-brown, with pale ciliæ. A very rare species, taken near London and in different parts of Yorkshire, by Mr, Chant.

SPECIES 8.—XYLOPHASIA RECTILINEA. PLATE XXXII., FIG. 9, 10.

SYNONYMES.—*Noctua rectilinea*, Hübner? Stephens, Ill.; Wood, Ind. Ent., pl. 12, fig. 233.
Engramelle, pl. 254, fig. 385.

This handsome insect measures about 1½ inch in the expanse of the fore wings, which are of a pale ashy-grey, except in the middle, which is marked with a large reddish-brown patch occupying the stigmatic region of the wings. The costa is dotted with black, and towards the tip with several white punctures; at the base of the wing are the ordinary dark dashes, with pale edges, observable in the allied species. The apical portion of the wing is much mottled with darker grey and brown, on which are several black dashes; and towards the anal angle is a pale waved streak; the cilia ashy, with black dots at the base; the hind wings as in the preceding species; the sides and fore margin of the thorax brown. The caterpillar figured by Hübner is reddish-brown, with pale lateral lines, and two yellowish triangular spots on the hind part of each segment. This is also a very rare species, found in Lancashire, at Trafford Park, where it has been taken by Mr. Marshall, to whom we beg to offer our thanks for the loan of this and other rare species.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DESCRIPTION OF PLATE XXXIII.

INSECTS.—Fig. 1. Hadena adusta (the dark brocade).
" Fig. 2. Hadena remissa (the gothic brocade).
" Fig. 3. Hadena thalassina (the pale-shouldered brocade).
" Fig. 4. Hadena genistæ (the light brocade).
" Fig. 5. Hadena contigua (the beautiful brocade). 6. The Caterpillar.
" Fig. 7. Hadena glauca (the glaucous sheers). 8. The Caterpillar.
" Fig. 9. Hadena plebeia (the common sheers). 10. The Caterpillar.

PLANTS.—Fig. 11. Cypripedium calceolus (Ladies'-slipper).
" Fig. 12. Eriothorum vaginatum (Hare's-tail Cotton-grass).

The whole of the insects in this plate are figured from specimens sent me by Mr. H. Doubleday, with the exception of H. remissa, from a specimen in the British Museum. The caterpillars are from Hübner.

I have omitted H. satura, which is now considered merely a pale and slightly, marked variety of H. adusta and also H. oblonga, which Mr. Stephens now considers a variety of H. remissa, in his specimen of which, the stigmata and other markings are rather larger, paler, and of more even colour than in the true species. If, on examining a specimen of H. obscura, it is found to be distinct, a figure of it will be given in a supplemental plate. H. N. H.

HADENA, SCHRANK, STEPH. (HADENA, PARS BDV., GUÉN.)

Many of the moths included in this genus by our English authors are known to collectors under the name of brocade moths, from the rich shining patches of varied tints upon the fore wings, which have the two ordinary stigmata distinct and rather approximating towards each other, the basal one being placed obliquely; the place of the supplemental stigma is indicated by a dark oval patch edged with black, and there is a pale striga running near the apical margin of the fore wings which is strongly angulated towards their posterior angle. The palpi are bent upwards, but do not extend much in front of the head, and they have the terminal joint slightly exposed; the antennæ are either simple or slightly serrated and ciliated beneath in the males. It is chiefly on account of the difference in the structure of the male antennæ that Mr. Curtis has separated the genus into two groups; confining the name of Hadena to the species figured in our thirty-fourth plate, and calling those represented on the thirty-third by the generic name of Rhizolitha, a group equivalent with Boisduval's tenth section of Hadena, that genus being regarded by Boisduval and Guénée as of far greater extent, and comprising the genera Charæas, Mamestra, Hadena, Trachea, and Euplexia, divided, however, into a great number of sections.

SPECIES 1.—HADENA ADUSTA. PLATE XXXIII., FIG. 1.

SYNONYMES. — *Noctua adusta*, Ochsenheimer; Esper; Duponchel; Boisduval; Stephens; Wood, Ind. Ent., pl. 12, fig. 235.
Noctua valida, Hübner, fig. 606, 607, 608.
Noctua duplex, Haworth.

This species measures 1¾ inch in the expanse of the fore wings, which are of a pale greyish-brown colour marked with brownish-black patches, having a black patch at the base within and a dark black line in the place of the supplemental stigma, and with the stigmata and strigæ paler coloured, edged with blackish-brown, one of the strigæ being before and the other beyond the middle, both much waved and connected together by the black line before mentioned; and beyond the stigmata is another pale striga deeply bidentate towards the posterior angle, and edged within with black spear-shaped dashes placed between the veins; the hind wings are whitish, with the veins and margin dark. The thorax is grey-brown, with two slender black arches in front. This rare species occurs in the woods of Kent and Surrey, also found on Chat-moss by Mr. Edleston, and by Mr. Doubleday at Epping, in May.

Dark varieties of this species occur in many cabinets under the name of H. Satura. Mr. Stephens also considered it possible that his specimens described under that name might be varieties of H. adusta, as

indeed an inspection of Wood's figure 236 seems to prove. As, however, Boisduval keeps them distinct (but placed next to each other, whilst Guénée removes Satura to his genus Aplecta), it will perhaps be useful to give Mr. Stephens's description, which is as follows: *Hadena satura* (Steph. Ill. H., 2, p. 181). "The wings are deeply marked with black, and a very conspicuous straight black lineola unites the third and fourth ordinary strigæ on the anterior wings, at the base of which is a black streak, and a dusky one near the base of the inner margin; the stigmata are pale brownish-ash with slender black edges, the posterior one somewhat tinted with yellow; on the hinder margin of the wing is a pale striga composed of numerous acute denticulations, of which two are more conspicuous, and form the usual **W** mark of the group; the ciliæ are brownish, interrupted with pale cinereous, and preceded by a series of conical black spots; posterior wings dusky, with the margin, nervures, and a central lunule of a darker hue." Mr. Stephens is not aware of the habitat of Marsham's two specimens, but thinks they were most probably taken near London, the insect having moreover been taken, he believes, at Coombe Wood. Mr. H. Doubleday also informs us that Mr. Weaver has this season (1842) taken a moth, in Scotland, which may be the true H. satura.

Note.—Hadena amica, Stephens, Ill. Haust., 2, pl. 23, fig. 2 (N. satura, Haworth, but not of Hübner), is omitted, on the authority of Mr. H. Doubleday, who informs us "that it is an American species, being very common in the United States, where his brother, Mr. Edward D., took it in abundance. It was, like many other American species, in Francillon's and other old cabinets."

SPECIES 2.—HADENA REMISSA. Plate XXXIII., Fig. 2.

Synonymes.—*Noctua remissa*, Hübner; Haworth; Stephens; Wood, Ind. Ent., pl. 12, fig. 237.
Noctua gemina, Hübner, fig. 482; Treitschke.

This species measures from 1½ to 1⅔ inch in the expanse of the fore wings, which are of a pale brown, clouded with darker shades, the costa being pale and marked with several small dark patches; the four ordinary strigæ are present, the two basal ones considerably undulated, with two black patches towards the base of the wing; the stigmata are pale, with the centres more or less dusky, and partially edged with black; a black stripe also runs behind the stigmata (which are placed on a large brown patch) connecting the two middle strigæ, beyond which the veins are dotted with black and white; the outer striga is pale, and less indented than in the preceding species. The hind wings are pale brown, with margin darker.

A rare species, although widely distributed. It has been found in the woods of Kent, Surrey, Essex, Hertfordshire, York, Cambridgeshire, and Shropshire.

Hadena oblonga of Haworth is, we believe, now considered to be but a variety of H. remissa; but as some doubt remains on the subject, we add a translation of Mr. Haworth's character. "Wings ashy, clouded; the costa, and an oblong patch, brown; and a white very much undulating streak along the posterior edges of the fore wings, which are semi-fuscous, the inner half of the wing being more ashy-coloured; the costal spots, apex, and ordinary stigmata are also ashy-coloured; and there is a large brown wedge-shaped spot on the hind part of the wing, and another oblong one towards the inner edge; the hind wings whitish, with the margin brown." In other respects it agrees with the preceding. Found near Wisbeach, also at Coombe, Darenth, Epping, and in Yorkshire.

SPECIES 3.—HADENA THALASSINA. Plate XXXIII., Fig. 3.

Synonymes.—*Noctua thalassina*, Borkh.; Stephens; Treitschke; Duponchel; Boisduval.
Noctua achates, Hübner.
Noctua gemina, Hübner, 483 ♀.

This handsome species measures about 1½ inch in the expanse of the fore wings, which are of a rich red brown, chocolate-coloured, varied with paler greyish tints. Along the costa are several dark dots arranged in pairs,

indicating the commencement of the ordinary strigæ, which are pale and edged with dusky lines, and very much undulated and curved; the base of the fore wings is pale in front, being marked with a black streak; the stigmata are pale greyish-brown, edged with black lines; the anterior one placed rather obliquely, and not so closely to the outer one as in some of the species; the supplemental stigma is immediately behind the basal one, and indicated only by a black, oval, oblique ring; the fourth striga is pale, with the **W**-like angulation very strongly marked, and with arrow-headed dark spots within; the hind wings are brown, rather darker along the outer edge. This is a rather abundant and widely-dispersed species.

SPECIES 4.—HADENA GENISTÆ. PLATE XXXIII., FIG. 4.

SYNONYMES.—*Noctua genistæ*, Borkhausen; Hübner; Treitschke; Boisduval; Stephens,
Noctua W. Latinum, Borkhausen; Esper.
Noctua rectilinea, Haworth.
Ph. Noct. dives, Donovan, 10, pl. 352, f. 1 (nec Haworth).

This beautiful species measures 1⅔ inch in the expanse of its fore wings, which are of a delicate silken ashy-grey colour, having a dark brown longitudinal dash along the base, terminating in the middle of three deep scallops edged externally with black, representing the second ordinary striga, the basal striga being obsolete. The middle of the wing is brown, the space immediately behind the stigmata being very dark, within which the black edging of the supplemental stigma may be traced; the stigmata are very pale brown, edged with a blackish line, the anterior one being nearly round; the apical portion of the wing is brown, with the fourth striga very slender and not very distinct, but exhibiting the strongly angulated **W**-like mark preceded by two blackish arrow-heads in the middle; the hind wings are pale brown, with the edges rather darker.

This is by no means a rare species, being rather widely dispersed in the south of England. It occurs in May.

SPECIES 5.—HADENA CONTIGUA. PLATE XXXIII., FIG. 5, 6.

SYNONYMES.—*Noctua contigua*, Wien. Verz.; Ochsenheimer; Treitschke; Hübner; Stephens; Wood, pl. 12, fig. 238.
Noctua Spartii, Borkhausen.
Noctua Ariæ, Esper.
Noctua dives, Haworth (nec Donovan).

This insect, which is the "handsome brocade" of our collectors, has its fore wings generally expanding rather more than an inch and a half, and beautifully mottled with grey, brown, buff, and ashy tints, sometimes tinged with purplish and the pale parts with yellow; at the base of the wing is a short black dash, in front of which are two dark transverse lines indicating the basal striga, which is rather broad; beyond these the wings are grey as far as the second striga, composed of three deep scallops edged with two dark lines; the anterior stigma is whitish and obliquely placed, the oblique pale colour extending backwards, and edged by the dark brown supplemental stigma, which has its hinder edge terminated by a black transverse line. The second stigma is *contiguous* to the basal one, and of a large size and kidney-like form; beyond this the colours are pale, but prettily varied, in which is perceived the third curved striga formed of small arches; the posterior striga is pale and similar to that of the preceding species, the **W**-like mark bearing several long arrow-like black marks within; the hind wings are pale whitish-brown, with the margin rather darker, and a slight striga beyond the middle.

The caterpillar feeds upon Vaccinium myrtillus, Spartium scoparium, various species of Genista, and Jacobæa Senecio. It appears in August and September, being at first yellowish-green, with yellow incisions, and darker yellowish-green spots and pale lines on the sides. After the last change of skin it is of a much darker colour, being reddish or reddish-brown, with darker marks and a pale lateral line, as represented in our figure. The perfect insect is found at the end of May and in June, especially on the trunks of trees, but it is by no means of common occurrence.

SPECIES ? 6.—HADENA OBSCURA.

SYNONYME.—*Noctua obscura*, Haworth; Stephens; Wood, Ind. Ent., pl. 52, fig. 1663.

The following is Mr. Haworth's description of this doubtful species:—"Closely allied to H. remissa, contigua, etc., and perhaps only a variety of one of them. The fore wings are more obscure or fuscous-ashy, with a large paler patch at the base of the costa, adjoining to which, within, are several deep black lines; towards the posterior margin is a nearly obsolete, undulating, slightly-pallid striga; the hind wings ashy-brown." No locality is given to the species by Haworth.

SPECIES 7.—HADENA GLAUCA. PLATE XXXIII., FIG. 7, 8.

SYNONYMS.—*Noctua glauca*, Hübner; Haworth; Ochsenheimer; Godart; Boisduval; Stephens; Wood, Ind. Ent., pl. 12, f. 239.

This and several of the succeeding species constitute a small group, first pointed out by Mr. Haworth under the name of Noctuæ fisso-notata, on account of the fore wings having a small, pale, notched mark in the centre; they constitute Boisduval's eighth section of Hadena. Their pupæ also differ from the rest of the genus, having the hinder segments produced into prominent angles, giving them the appearance of being dentated.

The present species measures about 1¼ inch in the expanse of the fore wings, which are of a glaucous brown colour, clouded with lighter shades; the costa marked with several black spots, indicating the origin of the ordinary strigæ, which are not very distinct, but are edged with black on both sides; the anterior stigma is rather obscure and edged with black, having a spot of the same colour behind, and adjoining to it, also edged with black; the second stigma is large and pale, with a dusky centre, and edged with black; beyond it the wing is paler, and has a very curved and not very distinct striga; and towards the hinder margin is a not very distinct pale striga, having several black arrow-headed marks towards the anal angle, placed upon the less strongly defined **W**-like mark. The hind wings are brown, with a yellowish tinge.

The caterpillar is yellowish-red marked with brown, with a paler dorsal line, and a blackish spot on each segment; and on each side of this line is a whitish dot, edged with blackish. It feeds in July and August, on Tussilago farfara and Cypripedium calceolus; and the perfect insect appears in May and June. It is a rare species, but has occurred near London, Cheltenham, and Matlock.

Note.—Mr. Curtis states that he possesses a fine male specimen of a Hadena taken at Kinnordy, which agrees pretty well with Godart's figure of *Hadena Lappo* (vol. 7, pl. 116, f. 3), and which he suspects may be the male of H. glauca.

SPECIES 8.—HADENA PLEBEIA. PLATE XXXIII., FIG. 9, 10.

SYNONYMES.—*Noctua plebeia*, Linn.; Haworth; Stephens; Curtis; Wood, Ind. Ent., pl. 12, fig. 240.
Noctua dentina, Fabr.; Hübner; Haworth (variety).
Noctua nana, Esper (variety).
Noctua leucostigma, Haworth; Stephens (variety).

This species also measures about 1¼ inch in the expanse of the fore wings, which are much more variegated than in the last species; the costa pale, with about eight black spots, the two basal ones succeeded by a waved striga edged with dark colour, which does not extend to the inner margin of the wing, but is inflexed towards the base, and succeeded on the disc of the wing by a pale patch with two black dashes; beyond which is the second striga edged with dark colour, and nearly straight; then follow the two stigmata, the basal one with a dark patch adjoining to it on either side; the stigmata are pale; the outer one, however, brownish in the inside, the space before and beyond the basal one dark brown, as also beyond the second one, which is divided by pale longitudinal stripes. The supplemental stigma is dark coloured and rather small, resting upon a blackish

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transverse bar; the space behind the stigmata forming a large pale patch, bifid towards the posterior angle of the wing; the third striga is not so much curved as in some of the preceding species, consisting of a series of small pale arches edged with brown lines; beyond this is a pale space, followed by the fourth striga, which is not so strongly angulated in the middle and edged with brown, and there is a marginal series of small dark conical dots. The hind wings are brown, with a slight pale bar across the middle. Numerous varieties occur in the strength of the markings. Amongst these varieties may be placed the

Noctua leucostigma, Haworth; Wood, Ind. Ent., pl. 12, fig. 241, which agrees with the typical individuals "in almost everything, except being much lighter coloured; and in being fulvous, or subfulvous, or rusty-fulvous in every part where that is brown or black."

Noctua dentina, Fabr. Fore wings cinereous, brownish in the middle, with the ordinary stigmata and a bifid spot of ashy colour. There is also a distinct spot on the lower margin at the base and a waved striga of yellow colour.

The caterpillar is a pale dirty brown, with the incisions rufescent, and with dorsal and lateral lines and dots of black; it feeds on the dandelion. The species is rather abundant and widely distributed.

DESCRIPTION OF PLATE XXXIV.

INSECTS.—Fig. 1. Hadena Ochracea (the tawny sheers).
" Fig. 2. Hadena Lithorhiza (the early grey).
" Fig. 3. Hadena Protea (the brindled green). 4. The Caterpillar.
" Fig. 5. Hadena Cucubali (the Campion moth). 6. The Caterpillar.
" Fig. 7. Hadena Capsincola (the Lychnis moth). 8. The Caterpillar. 9 and 10. Caterpillar when young.
" Fig. 11. Hadena Saponariæ (the bordered gothic).
PLANT.—Fig. 12. Lychnis inflata (Inflated Catchfly).

The whole of the moths figured in this plate are from specimens sent me by Mr. H. Doubleday, as also the larva of H. Capsincola. The larvæ of H. Cucubali and H. Protea are from Hübner. H. N. H.

SPECIES 9.—HADENA OCHRACEA. PLATE XXXIV., FIG 1.

SYNONYMES.—*Noctua ochracea*, Haworth; Stephens, Ill. H. 2, pl. 23, fig. 3; Wood, Ind. Ent., pl. 12, fig. 242.
Hadena peregrina? Ochsenheimer

This species also measures about 1¼ inch in the expanse of the fore wings, which, as well as the entire insect, are of very pale clayish-buff colour, the fore wings varied with darker markings: towards the base are several dusky oblique lines separating the following space, which is paler than the base, and which is terminated by three deep scalloped lines indicating the second striga; the middle of the wing is darker and bears the three stigmata, the two ordinary ones being pale, with the centres rather darker and the edges black, and the supplemental one formed of a brownish oblique patch edged with a blackish line; beyond the stigma is a much-curved row of small blackish arched lines succeeded by a subapical brownish shade, in which the fourth striga undulates, the middle of which is not so strongly angulated as usual, but is marked with several arrow-headed dark marks; the hind wings are marked with a slight paler wave beyond the middle.

Rare; found near London, Brighton, and in Norfolk. It occurs in the winged state at the end of June. It was accidentally omitted in Mr. Doubleday's list of Noctuidæ published in the Entomologist for October 1842.

SPECIES 10.—HADENA LITHORHIZA. PLATE XXXIV., FIG. 2.

SYNONYMES.—*Noctua Lithorhiza*, Borkhausen; Curtis; Stephens; Wood, Ind. Ent., pl. 12, fig. 243.
Noctua aureola, Esper.
Noctua operosa, Hübner; Haworth.

This very distinct species measures rather more than 1½ inch in the expanse of the fore wings, which are of a

slaty-grey colour, very much irrorated with brownish above, and blackish markings, which on the left wing give to the characteristic portion the appearance of the two figures 29 in old cursive text. The costa is marked with several dusky dots, and there is a pale oblong-oval stripe, edged behind with black at the base. The black line being obliquely deflexed at the extremity behind the anterior stigma, which is pale, but with a dusky centre, the dark line by which it is edged being also obliquely continued behind the second stigma, which is similarly coloured to the anterior one, the space between them being dark but edged with the black edging of the stigmata; towards the middle of the inner margin of the wing is a black angulated line edged externally with white, there being no other indication of the ordinary strigæ. The space beyond the stigmata is less varied, except towards the margin, where are a row of conical black spots preceded by a paler tinge of grey, two of which towards the posterior angle are confluent, and followed by a very slender row of dusky lunules. The hind wings are pale greyish-brown, with a slight dusky, transverse fascia beyond the middle; the abdomen and cilia of the hind wings are tinged with rosy, the latter preceded by a very slender but interrupted dark line.

This is a common and widely-distributed species, occurring on the trunks of trees in March and April; it is also fond of frequenting the flowers of the sallow. In its early appearance, therefore, as well as in several minute structural peculiarities, it is distinct from the preceding and following species.

SPECIES 11.—HADENA PROTEA. PLATE XXXIV., FIG. 3, 4.

SYNONYMES.—*Noctua protea*, Wien. Verz.; Esper; Hübner; Treitschke; Duponchel; Boisduval; Godart; Guénée.
Noctua nebulosa, Borkhausen.
Noctua seladonia, Haworth.
Polia seladonia, Stephens.

We have followed Boisduval and Guénée in uniting this insect to the genus Hadena, although it must be observed that in its markings and some other characters, as well as in its larva state and its autumnal appearance in the perfect state, it materially differs from all the other Hadenæ. The fore wings measure from abont $1\frac{1}{3}$ to $1\frac{1}{2}$ inch in expanse, and are very variable in colour, being of a reddish-brown varied with grey and greenish, and with numerous dusky markings. The costa, with numerous oblique blackish dots and a few white specks towards the tip; the two ordinary stigmata are grey, with the middle dusky and slightly edged with a fine black line. Towards the base of the wing is a whitish patch edged with blackish externally, beyond which the space is also darker; towards the middle of the hinder margin is another pale patch, above which is an oblique dark mark resting on an irregular black line, which is bent upwards towards the outer stigma; beyond this the wing is of a clearer colour and whitish towards the apex, having a pale irregular submarginal striga considerably angulated towards the middle, and outwardly edged with darker brown, and with a more regular series of conical minute brown spots tipped with black along the margin. The hind wings are pale brown with the base whitish, and beyond the middle and towards the margin run two slender pale strigæ; the margin itself with a row of small black wavy lines. The wings beneath are pale grey, very much powdered with blackish scales and a central blackish dot in each, and a marginal row of minute dark conical dots; the ciliæ are cinereous, with brown spots. This is a most variable species; some individuals having nearly all the green and reddish-brown tints of the fore wings obliterated, whilst others have them of a nearly uniform pale green with a few black streaks; others are nearly grey, with the inner margin, stigmata, and subapical fascia nearly white.

The caterpillar is dirty-green coloured, with small dark punctures, the head clearer green, with two whitish spots edged with black and a yellow mark on the first segment, a yellow dorsal line and one of the same colour at each side along the stigmata. It feeds on the oak; the imago occurs in September and October, and is by no means a rare insect.

SPECIES 12.—HADENA CUCUBALI. Plate XXXIV., Fig. 5, 6.

Synonymes.—*Noctua Cucubali*, Wien. Verz.; Hübner; Haworth; Stephens; Wood, Ind. Ent., pl. 12, fig. 244; Curtis, Brit. Ent., pl. 308.
Noctua rivularis, Fabricius.
Noctua triangularis, Thunberg.

This and the following species differ materially from the rest of the genus, not only in the clear map-like markings of their wings, but also in their slender, simple antennæ, and the æstival period of its appearance; it has indeed been removed from the genus Hadena by Boisduval and Guénée, and introduced into the genus Dianthæcia, although it is one of Treitschke's typical species of the present genus, and Curtis has restricted the genus Hadena to it and its allies. It is a very handsome insect, measuring 1⅓ inch in the expanse of the fore wings, which are of a bright brown varied with rosy and with dark brown patches. The costa has numerous dark patches; towards the base of the wing are several alternate dark and light stripes placed obliquely, succeeded by a large dark brown patch, above which is the anterior stigma, which is pale brown edged with yellow placed obliquely, its base touching the base of the outer stigma, which runs in the opposite direction, and is similarly edged with clear yellow, the space between them forming a dark brown triangle, and beyond the second is the third ordinary pale striga ornamented with two chains of black dots, one being arched; beyond these the wing is very much variegated, including the fourth striga, which is very slender and pale, and very much angulated into a **W** in the middle, the margin having a row of black, interrupted lunules, edged within with yellow; the cilia is long, notched, and spotted. The hind wings are brownish with the margin more dusky, and an obscure pale transverse line beyond the middle; the ciliæ rosy-ochre. The caterpillar is palish green at the sides, with the back brownish in front and paler reddish behind, the head and thoracic segments with several dark lines, the posterior ones with an oblique brown one on each side, and obscurely dotted. It feeds on Lychnis dioica and Cucubalus bacciferus. The moth is by no means of common occurrence, although very widely distributed; it is found in the summer months.

SPECIES 13.—HADENA CAPSINCOLA. Plate XXXIV., Fig. 7, 8, 9, 10.

Synonymes.—*Noctua Capsincola*, Wien. Verz.; Hübner; Haworth; Treitschke; Stephens; Wood, Ind. Ent., pl. 12, fig. 245.
Noctua bicruris, Hufnagle.

This species is closely allied, in colours, marking, and habits, to the preceding; it is, however, much less beautiful. The fore wings measure about 1⅓ inch in expanse, and are of a brown colour varied with paler ashy markings; the costa is spotted with black and white. Near the base of the wing is an abbreviated pale striga, behind which is a black hook-like mark placed longitudinally towards the inner margin; beyond this the wing is considerably mottled, the second striga being indicated by a double transverse row of black arches; the stigmata are pale with white edges, their hind parts not being united together, as in the preceding species; the space between them is dark-coloured, but behind them it is light and rather mottled; beyond them runs the third ordinary striga, composed of a double curved row of black crescents followed by the fourth striga, which is white, forming a strong curve towards the anal angle, and with the middle angulated into a **W**, and bearing several black conical dots within; on the margin is a row of small black triangular spots; the cilia is pale brown, with a row of darker arched lines interrupted by pale longitudinal stripes. The hind wings are ashy-brown, with the margin and a central lunule darker, and with a slightly-indicated pale fascia beyond the middle, and a pale dot on the margin towards the anal angle.

The caterpillar feeds on the seeds in the capsules of Lychnis dioica, being, when young, green with dark spots; it afterwards, however, assumes an earthy colour, with small black speckles, especially on the back, each side being marked with a dusky oblique line on the back, and a brownish line above the feet. The perfect insect

appears in the months of June and September, being probably double-brooded. It is of common occurrence, and is widely distributed.

SPECIES 14.—HADENA SAPONARIÆ. PLATE XXXIV., FIG. 11.

SYNONYMES.—*Noctua Saponariæ*, Borkhausen; Treitschke; Stephens; Esper; Godart; Wood, Ind. Ent., pl. 12, fig. 246. *Noctua typica*, Hübner. *Noctua calcatrippe*, Vieweg. *Ph. Noct. reticulata*, Villars. *Noctua marginosa*, Haworth.

This beautiful and very distinct species measures rather more than $1\frac{1}{2}$ inch in the expanse of the fore wings, which are of a bright brown colour, the veins, as well as the markings, of a clear buff; the costa has several slight angulated black lines indicating the origin of the pale strigæ, and the three principal veins are broadly pale; near the base of the wing is an angulated interrupted striga, edged with a black line; beyond which is the second striga, forming a regular curve, edged outwardly with black, the space between it and the anterior stigma forming a dark triangular patch; this is of an oval form, and placed rather obliquely, with the margin paler; the space between it and the next stigma is dark brown, and the latter forms a pale arch, emitting several black lines behind; the third striga is not much curved, except towards the costa, and is ornamented with a row of small dark arches. The space between the third and fourth strigæ consists of alternate dark and light longitudinal dashes, the fourth striga being but very little angulated; on the margin of the wing at the base of the cilia is a row of conical black dots, and the cilia is brown, interrupted by pale lines; the hind wings are pale buff, with the margin dusky on the under side; the wings are pale, with a central black spot, and several submarginal dark stripes.

The caterpillar is to be found in July and August on Saponaria officinalis, various species of Dianthus, and Cucubalus, etc. It is of a clear green colour, without any markings; the head greenish-brown, and the two anterior segments with a greenish-brown patch. The moth appears in the middle of the following summer.

Treitschke places this species at the head of the genus Hadena, and Stephens at the end. Both in its markings and larva state it, however, differs from the rest of the genus; and Guénée separates it and an allied continental species under the generic name of Neuria (from the pale veining of the wings); whilst by Boisduval it is formed into the eighth section of Hadena.

DESCRIPTION OF PLATE XXXV.

INSECTS.—Fig. 1. Heliophobus popularis (the feathered gothic).
" Fig. 2. Heliophobus leucophæus (the feathered ear). 3. The Caterpillar.
" Fig. 4. Euplexia lucipara (the small angle shades). 5. The Caterpillar.
" Fig. 6. Hama aliena (the large nutmeg).
" Fig. 7. Hama basilinea (the rustic shoulder-knot). 8. The Caterpillar.
" Fig. 9. Hama Testacea (the lesser flounced rustic).
" Fig. 10. Hama connexa (the union rustic).

PLANT.—Fig. 11. Eriphorum alpinum (Alpine Cotton-grass).

The whole of the moths figured in this plate are from specimens sent me by Mr. H. Doubleday, with the exception of H. Leucophæus, which is from the specimen in the British Museum. The caterpillars of H. Leucophæus and H. basilinea are from Hübner; that of E. lucipara from Sepp. H. N. H.

HELIOPHOBUS, BOISDUVAL, STEPHENS.

The species of this genus are at once distinguished, by having the antennæ in the males strongly bipectinated, whence Mr. Haworth and other authors described the species as belonging to the old genus Bombyx. They are moreover distinguished by their longitudinally striped caterpillars, from the species of Hadena last described,

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which H. popularis closely resembles, in its markings and pale veins. The palpi are rather short and porrected; the spiral tongue very short; the thorax subquadrate, and the abdomen of the males tufted. The caterpillars are robust and naked. They feed upon low-growing plants, hiding themselves during the day, whence the generic name, which signifies Dread-of-the-sun. The pupa is buried under ground. Boisduval arranges the genus next to Agrotis, and includes in it Charæas graminis and some other moths.

SPECIES 1.—HELIOPHOBUS POPULARIS. PLATE XXXV., FIG. 1.

SYNONYMES.—*Noctua popularis*, Fabricius; Haworth; Stephens; Wood, Ind. Ent., pl. 12, fig. 247.
Noctua graminis, Hübner.
Noctua Lolii, Esper.
Noctua typicoides, Donovan, 15, pl. 505.

This species measures nearly $1\frac{3}{4}$ inch in the expanse of the fore wings, which are brown with white veins; in the middle of the wing are two geminated strigæ, the space between them being darker, and bearing the three stigmata; beyond these is a submarginal row of arrow-shaped spots, the point directed towards the base of the wing, with the fourth striga yellowish-white, immediately adjoining and more or less interrupted; on the margin is a row of black dots; the two ordinary stigmata are pale yellowish-ash, with the centres darker, the anterior being small and circular; the supplemental stigma is ashy, with a black edge; the cilia is brown, with two pale lines; the hind wings are whitish, with a broad dusky border.

It is by no means rare, and is a widely-distributed species.

SPECIES 2.—HELIOPHOBUS LEUCOPHÆUS. PLATE XXXV., FIG. 2, 3.

SYNONYMES.—*Noctua leucophæa*, Wien. Verz.; Hübner; Stephens; Ill. H. 2, pl. 24, f. 1; Wood, Ind. Ent., pl. 12, fig. 248.
Bombyx fulminea, Fabricius; Devilliers.
Bombyx vestigialis, Esper (male); Devill.
Bombyx ravida, Esper (female).
Pachetra leucophæa, Guénée.

This species, which Guénée has formed into a separate genus, and which Boisduval placed as his first section of the genus Hadena, measures $1\frac{3}{8}$ inch in the expanse of the fore wings, which are of a greyish-white, varied with pale buff, and with darker clouds of brown. The ordinary strigæ are indistinct, except the second, which is indicated by two pale arched lines behind the base of the anterior stigma; the third is represented by a few dark scallops behind the second stigma, and a few dots on the veins; and the fourth by the indistinct striga towards the apex of the wing, having a more or less distinct series of dark conical spots resting upon it within, and the tip of the wing beyond it being brown. The stigmata are large, distinct, and pale, with the centres darker and the edges blackish; the hind wings are ashy-white, with a dark central lunule and a transverse striga, the extreme margin formed by a very slender interrupted dark line. The specimen figured by Mr. Stephens is considerably paler than that represented in our plate, with the markings less distinct. The caterpillar is reddish-brown, with dark longitudinal stripes. The moth is very rare in this country, the only known specimens having occurred near Bristol in July, 1816. Boisduval gives June as the time of its appearance.

EUPLEXIA, STEPHENS. PHLOGOPHORA, PARS TREITSCHKE, BDV., CURTIS.

The species of which this group is composed, namely, our only English species, Noctua lucipara, and two continental ones, seem to form a passage between the Hadenæ, with which they are associated by Guénée, and the typical Phlogophoræ, with which latter they agree in various important respects. The palpi are obliquely porrected and slightly elevated; the eyes are naked; the thorax crested behind; the fore wings longitudinally folded in repose, the ciliæ forming a dentate margin to the wings; the antennæ of the males closely clothed with bristles; the caterpillars glabrous, green-coloured, with darker oblique lateral lines and minute black tubercles, and slightly

angulated towards the extremity of the back. They undergo their transformations beneath the surface of the ground.

SPECIES 1.—EUPLEXIA LUCIPARA. Plate XXXV., Fig. 4, 5.

Synonymes.—*Phal. Noct. lucipara*, Linnæus; Donovan, pl. 230, fig. 2; Hübner, Noct., fig. 55; Haworth; Stephens; Curtis, Ill. B. Ent., pl. 619; Wood, Ind. Ent., pl. 12, fig. 259. *Noctua flavo-maculata*, Fabricius.

This species measures 1⅓ inch in the expansion of the fore wings, which are of a brown colour, with a purplish bloom, giving them a greyish tinge towards the anterior portion. Near the base are several slender transverse black lines, and a broad dark central fascia, narrowed behind, and bearing the anterior stigma, which is brownish-grey, and the posterior one pale yellow, with the centre darker; beyond this the ground-colour of the wing is much paler, with a slender brown striga running obliquely across it, followed by a slender, pale, angulated one upon the dark apical portion of the wings; the ciliæ are dark-coloured, with the base pale; the hind wings are pale ochre-coloured, with the margin brown, bearing a pale, ochreous, angulated striga near the anal angle. There is also another paler undulated striga across the middle.

The caterpillar is green, with minute black tubercles, and a slender dark dorsal line, emitting numerous oblique strigæ of the same colour; a dark longitudinal line above the feet, edged above with white. It feeds on various plants, such as Rubus fruticosus and saxatilis, Rumex acetosa, Echium vulgare, Anchusa officinalis, etc. It appears in the autumn; and the moth, which is rather rare as a British species, is produced in Jnue. It has been found in the woods round London, as well as in Devonshire, Hampshire, Dorsetshire, etc.

HAMA, Stephens. LUPERINA, p. Bdv., Guén.

This genus is composed of species closely allied in their preparatory states to those of Charæas. Their antennæ, however, are much more simple in the males, being only ciliated or slightly serrated; the palpi are short, with the terminal joint distinct and somewhat clavate, although small; the eyes are large and naked; the thorax is but slightly crested; the wings are not longitudinally folded, but deflexed at the sides of the body in repose, the margin being nearly entire. The caterpillars are thick, fleshy, and naked, of dark colours, with pale longitudinal stripes. The transformations are undergone beneath the surface of the earth.

SPECIES 1.—HAMA ALIENA. Plate XXXV., Fig. 6.

Synonymes.— *Noctua aliena*, Hübner; Treitschke; Stephens; Doubleday; Wood, Ind. Ent., pl. 12, fig. 260. *Noctua contigua*, Haworth.

This species measures about 1½ inch in the expansion of the fore wings, which are mottled with fulvous, brown and ashy colours, the stigmata and strigæ (three in number) being pale, the outer striga being bidentate. Across the middle of the wing is a dusky cloud, on which the stigmata are placed; the anterior one being pale ashy, and the outer one clouded in the middle with a darker shade, and margined with a pale line; the apex of these wings is dark-coloured, and the ciliæ alternately pale and dark; the hind wings are pale ashy-coloured, with a dusky central lunule; the veins and margin also brown. The species is widely dispersed, but by no means common.

SPECIES 2.—HAMA BASILINEA. Plate XXXV., Fig. 7, 8.

Synonymes.—*Noctua basilinea*, Wien. Verz.; Fab.; Hüb.; Haworth; Stephens; Guénée; Boisduval; Wood, Ind. Ent., pl. 12, fig. 261. *Noctua nebulosa*, Vieweg.

This species also measures about 1½ inch in the expanse of the fore wings, which are of a dull, pale, greyish-brown colour, less strongly shaded with darker clouds than in the preceding species. From the base of the

wings runs a short, curved, slender, black line. The costa is marked with several small dark brown dots arranged in pairs; the anterior stigma is nearly round, and preceded by a dark dot, it is edged by a fine dark line; the outer stigma is large and ear-shaped, of a pale ashy-brown, with a dusky patch in its hind part; the space between and behind the stigmata is richer and darker coloured than the rest of the wing, with a small oval ring immediately behind the anterior stigma. This space is succeeded by a curved row of small, duplicated, crescent-like marks, forming a small arched strigæ; and beyond these, towards the apex of the wing, is a pale and very irregular striga, terminating in a large dusky patch on the costa: the ciliæ rest upon a row of minute black dots; the hind wings are pale dull buffish-brown, with the veins, central lunule, and margin darker; the apex with a series of small, black, arched lines.

The caterpillar is brown, speckled with black, with the belly greyish, and the back and sides marked with a pale yellowish longitudinal stripe. It feeds on grasses in the autumn, and the moth appears in June, frequenting woods and gardens. It is an abundant species.

SPECIES 3.—HAMA TESTACEA. PLATE XXXV., FIG. 9.

SYNONYMES.—*Noctua testacea*, Hübner; Stephens; Guénée; Wood, Ind. Ent., pl. 12, fig. 262.
Noctua lunata-strigosa, Haworth.
Noctua unca, Haworth (variety).
Noctua x-notata, Haworth (variety).

This species is very variable both in size and appearance, the fore wings varying from 1¼ to more than 1⅓ inch in expanse. They are generally of a pale reddish or greyish-brown tinge, varied with darker shades, and with more or less distinct markings. A pale undulated broken striga is placed before the middle of the wing, followed by the two ordinary stigmata, which are irregularly edged with a pale and a brown line, followed by a very much curved striga, formed of blackish lunules, united together and edged with paler colour; the hinder portion of this striga being connected with the preceding striga, behind the stigmata, by a black mark occupying the place of the supplemental stigma, resembling a black hook, producing a black streak; the apical portion of the wing is of a brownish hue, scarcely darker than the rest of the wing, preceded by the pale and much undulated slender fourth striga; the hind wings are almost white, with a row of slender dusky curved lines along the margin. Some specimens are almost immaculate; others have the fore wings of a reddish tinge, with an X-like central black mark, and an arched striga of black lunules beyond the middle. Such specimens were regarded by Mr. Haworth as a distinct species under the name of N. x-notata. The species is very abundant and widely dispersed, appearing in the perfect state in August and September.

SPECIES 4.—HAMA CONNEXA. PLATE XXXV., FIG. 10.

SYNONYMES.—*Noctua connexa*, Stephens; Borkhausen; (Ochsenheimer?) Wood, Ind. Ent., pl. 52, fig. 1664.
Noctua Elota, Hübner; Guénée; Doubleday.
Noctua pabulitricola, Scriba.

This species measures 1⅓ inch in the expanse of the fore wings, which are elegantly mottled with pale cream-grey and brown markings. The base is pale, with several dark patches on the costa; a black lineola at the base separates the dark portion from the anterior. The centre of the wing is occupied by a large dark brown fascia, narrowed behind, and edged with pale strigæ with geminated darker lines; on this space are placed the stigmata, which are distinct, with the centre darker, and behind them is a dark line connecting the strigæ; the apical portion of the wing is pale grey, the apex being pale brown, and bearing a subapical striga, which is formed of rather large arched spots. The hind wings are brown, with a dusky lunule in the centre, and an indistinct paler bar beyond the middle; the margin darker. Very rare; "Lindwood, near Barnsley," Mr. Stephens. Boisduval gives June as the time of its appearance in the perfect state.

DESCRIPTION OF PLATE XXXVI.

INSECTS.—Fig. 1. Mamestra furva (the dusky brocade).
" Fig. 2. Mamestra Pisi (the broom moth). 3. The Caterpillar.
" Fig. 4. Mamestra oleracea (the bright line browu eye). 5. The Caterpillar.
" Fig. 6. Mamestra suasa (the dog s tooth).
" Fig. 7. Mamestra nigricans (the dusky nutmeg).
" Fig. 8. Mamestra Brassicæ (the cabbage). 9. The Caterpillar.
" Fig. 10. Mamestra albicolon (the white colon).
" Fig. 11. Mamestra Persicariæ (the dot). 12. The Caterpillar.
" Fig. 13. Mamestra Chenopodii (the nutmeg). 14. The Caterpillar.
" Fig. 15. Mamestra Anceps? (the doubtful nutmeg).

PLANTS.—Fig. 16. Lathyrus nissolia (the crimson Vetch).
" Fig. 17. Polygonum Persicaria (common Persicaria).

The whole of the moths figured in this plate are from specimens sent me by Mr. H. Doubleday, with the exception of M. suasa, from the male specimen in the British Museum, and M. nigricans and M. anceps? from the cabinet of Mr. Stephens, who considers that the latter insect, taken by himself a short time since, must be the Anceps of Duponchel. The caterpillars are from Hübner, with the exception of M. Persicariæ, from a specimen taken in the garden of Mr. Westwood, and M. Oleracea, from a specimen taken in Yorkshire, and kindly forwarded to me for the purpose of being figured in this work by Mr. H. Doubleday. H. N. H.

MAMESTRA, OCHSENHEIMER. HADENA, PARS BDV., GUÉN.

The species of this group (as M. Guénée has clearly shown in the "Annales de la Société de France," 1838, p. 244) can scarcely be separated in a natural distribution of the family from the Hadenæ, which like them have the W-like mark on the subapical striga of the fore wings. The species are, for the most part, of large size, and of dark colours. The fore wings have the apex slightly denticulated; the terminal joint of the palpi is very small; the antennæ are simple in both sexes; the forehead densely crested; the thorax with a bifid crest on the back. The caterpillars are smooth, and varied in their colours. The majority of them feed on low plants, concealing themselves by day.

SPECIES 1.—MAMESTRA FURVA. PLATE XXXVI., FIG. 1.

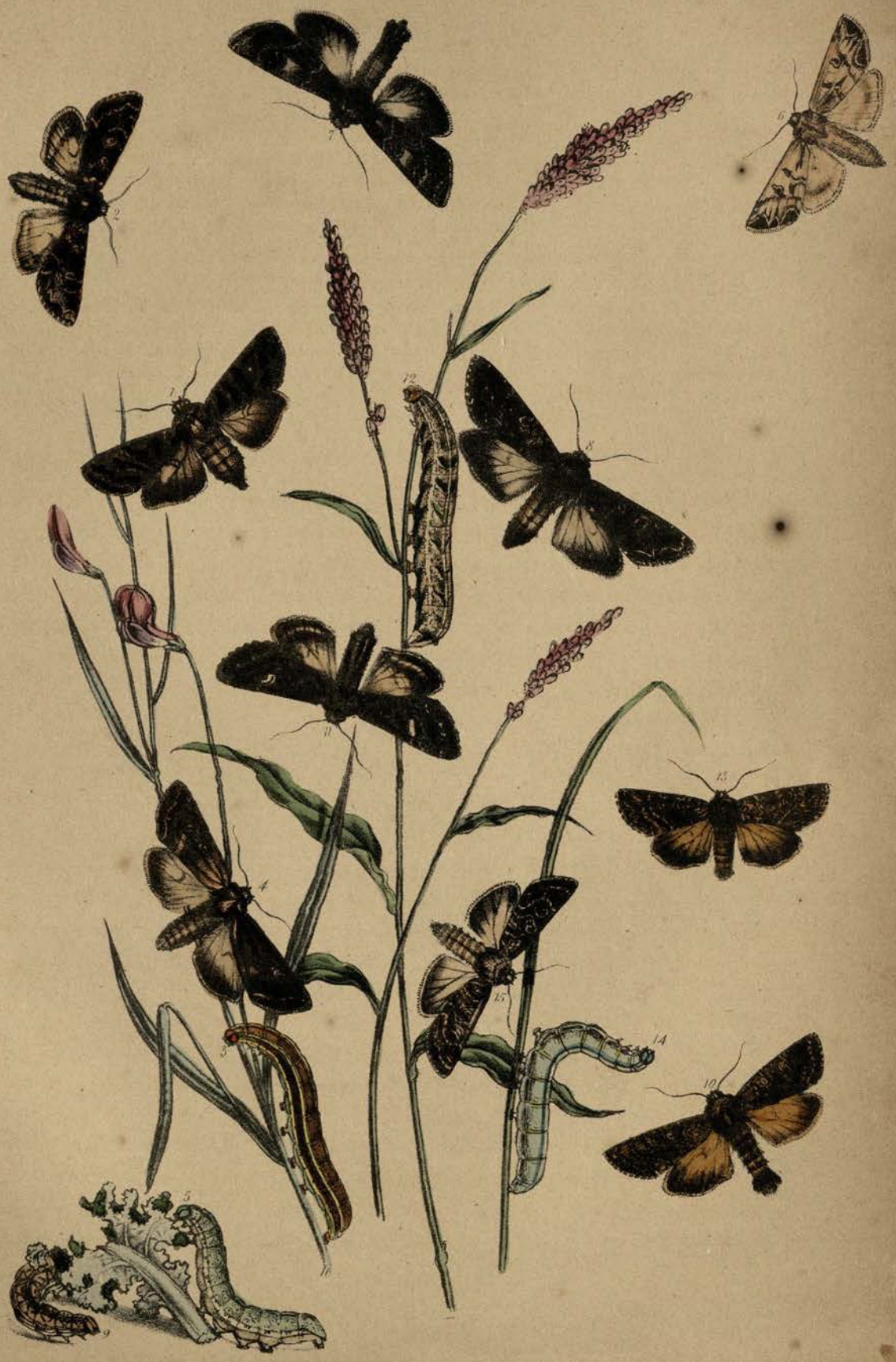
SYNONYME.—*Noctua furva*, Wien. Verz.; Hübner; Treitschke; Stephens; Wood, Ind. Ent., pl. 12, fig. 249.

This species measures about 1½ inch in the expanse of the fore wings, which are of an obscure brown colour, with ashy and fulvescent shades. The ordinary strigæ are distinct and pale, with dark edgings, except the subapical one, which is merely a pale line on a dark ground, very much undulated, especially in the middle; the stigmata are distinct but dusky, with a dark edging; the margin has a row of black dots, followed by a pale line; the ciliæ alternately brown and ochreous; the hind wings are ashy-brown at the base, with the margin considerably darker as well as the nervures, and a central lunule. Found, but not very abundantly, in the woods round London; also in Yorkshire and Sussex, and lately at Epping, by Mr. H. Doubleday.

SPECIES 2.—MAMESTRA PISI. PLATE XXXVI., FIG. 2, 3.

SYNONYME.—*Phal. Noct. Pisi*, Linn.; Donovan 2, pl. 52; Haworth; Wilkes, pl. 7; Albin, pl. 32, fig. 51, c—f; Ochsenheimer; Treitschke; Stephens; Wood, Ind. Ent., pl. 12, fig. 250.

This handsome species measures rather more than 1½ inch in the expanse of the fore wings, which are of a brownish-red colour, clouded with rather darker tints, especially across the middle of the wing; the stigmata and ordinary strigæ are present, but almost concolorous with the rest of the wing, except the subapical one, which is white and very much angulated, especially towards the posterior angle, where it is dilated; beyond



the middle of the wing the costa is marked with four or five white dots, and the cilia is alternately buff and reddish; the hind wings are pale ochreous-brown, with the margin dusky, with a paler subapical striga, occasionally interrupted; on the under side the costa and apex of all the wings is broadly tinged with red scales.

The caterpillar is reddish-brown, with the greenish sides marked with pale yellow longitudinal lines; the belly paler, and feet red. It feeds on the pea, brown vetch, etc., in the autumn; and the moth, which is very abundant, and dispersed over the greater part of the country, appears in the following June.

Obs.—Nearly allied to, if not a strong variety of the preceding insect, is a specimen found in Cumberland, in July, 1827, by Mr. Weaver, which Mr. Stephens has described (Brit. Ent., Haust. 2, p. 192, and Wood, Ind. Ent., pl. 12, fig. 251) as doubtfully identical with the *Noctua splendens* of Hübner. The fore wings measure $1\frac{5}{12}$ in expanse, and of a red-brown colour, with three darker transverse strigæ, the exterior one terminated by an interrupted white line; the stigmata rather small, pale reddish-ash, the anterior immaculate, the posterior with dusky clouds; the cilia interrupted with cinereous; the hind wings ochreous-ash; with the margin, an interrupted transverse striga, central lunule, and nervures dusky; cilia flavescent.

SPECIES 3.—MAMESTRA OLERACEA. PLATE XXXVI., FIG. 4, 5.

SYNONYME.—*Ph. Noct. oleracea*, Linnæus; Hübner; Haworth; Treitschke; Albin, pl. 27, fig. 40 a—d; Stephens; Wood, Ind. Ent., pl. 12, fig. 252.

This species measures about $1\frac{1}{2}$ inch in the expanse of the fore wings, which are of a nearly uniform chestnut colour, or but very slightly clouded, with the strigæ obsolete, except the subapical one, which is slender, whitish, and dentate in the middle; the anterior stigma is small, round, and dusky, but surrounded by a pale ring; the posterior one is more or less orange tinted, having a dusky shade behind it, as well as a supplemental dusky stigma behind the anterior one; the hind wings are dusky white, with the veins, a central lunule, and the border dusky.

The caterpillar is livid, reddish, or yellowish-brown, with a dark stripe on the back and at the sides, and a whitish one nearly over the feet. The under side and feet are light brown, and it is dotted with black between the dark stripes. When young, and also sometimes when fully grown, the ground-colour is green, as represented in our plate. It feeds on all sorts of cabbages, lettuces, and other vegetables in the autumn, sometimes committing much havoc in our gardens. It undergoes its transformations underground, where it may be found during the winter; and the moth appears at the beginning of the following summer.

SPECIES 4.—MAMESTRA SUASA. PLATE XXXVI., FIG. 6.

SYNONYMES.—*Noctua suasa*, Wien. Verz.; Hübner; Ochsenheimer; Stephens; Wood, Ind. Ent., pl. 12, fig. 253.
Noctua dissimilis, Vieweg.
Noctua leucographa, Esper.
Noctua dens-canis, Haworth.

This species measures about $1\frac{1}{3}$ inch in the expanse of the fore wings, which are of a pale, luteous, shining brown colour, with a short black streak running from the base, and slightly furcate at its tip; the anterior stigma is small and blackish, the centre rather paler coloured; behind which is a pale dentated striga bearing a conical black patch, which appears like the continuation of the basal streak; the outer stigma is very dark in its hinder part, with a slender whitish edge, margined with dusky lines; beyond which is a dusky striga, followed, at some distance, by the subapical one, which is very much curved, especially towards the hinder angle, and deeply dentate in the middle, bearing several black conical dashes on its inner margin; the cilia and hind wings are pale fuscous, the latter with a subapical dusky bar.

The caterpillar is green, with red and blue spots, and several blue streaks. It feeds on cabbages, lettuces,

and other herbs; and the moth appears in June, but is very rare in this country, having only occurred near London, at Birchwood, and in Norfolk.

SPECIES 5.—MAMESTRA NIGRICANS. Plate XXXVI., Fig. 7.

Synonymes.—*Noctua nigricans*, Vieweg? Stephens, Ill. H. 2, pl. 24, fig. 2; Wood, Ind. Ent., pl. 12, fig. 254.
Noctua objecta, Hübner.

This species measures 1⅝ inch in the expanse of the fore wings, which are nearly of a dull uniform blackish, or olive-brown hue, with the strigæ scarcely visible, except the subapical one, which is slender and angulated, but very obscure, as is also the striga beyond the second stigma; the costa is marked with several rather darker spots; the stigmata are slightly edged with dusky, the posterior one being rather brighter, with several whitish punctures, and succeeded by several blackish dots in a curved line; the hind wings are dirty white, with the nervures and margin dusky; there is also a row of small lunate dark lines at the base of the cilia. Very rare; two specimens only found in the New Forest by Mr. Bentley, and in Darenth Wood at the end of June.

SPECIES 6.—MAMESTRA BRASSICÆ. Plate XXXVI., Fig. 8, 9.

Synonyme.—*Phal. Noct. Brassicæ*, Linn.; Hübner; Haworth; Albin, pl. 28, fig. 42, 43, a—e; pl. 29, fig. 45, e—h; pl. 67, fig. a—d; pl. 78, fig. a—d; Stephens; Wood, Ind. Ent., pl. 12, 255.

This very common insect measures from 1½ to 1⅝ inch in the expanse of the fore wings, which are of a brown colour (variable in its tints in different specimens) clouded with darker shades; the costa is marked with several dark dots, arranged in pairs, indicating the commencement of the strigæ; the basal one is distinct and much angulated, but abbreviated behind; the second one is transverse and wavy, preceding the anterior stigma, which is of a moderate size and rather paler than the rest of the wing, and edged with a blackish line; behind this is a small, blackish, ring-like mark, representing the supplemental stigma; the outer stigma is marked on its exterior part with several whitish specks, and is followed by a very curved striga, composed of numerous small blackish arches. The subapical striga is whitish, and very much and irregularly curved, with the central part deeply denticulated; along the margin is a row of small black arched dots; the cilia is brown, with white dashes; the hind wings are brown, with the base rather lighter coloured.

The caterpillar is green, and more or less varied with grey or blackish; it has a dark dorsal stripe, bearing a pale indistinct hue; at the sides is also a dirty yellow stripe, with the spiracles white. It feeds on cabbages, lettuces, etc., eating out the heart; and as it occasionally appears in great numbers, the injury which it commits is extensive; the only remedy is that of hand-picking before the caterpillars descend into the ground, where they undergo their transformation, being full fed in the autumn, and the moth appearing in May and June.

Obs.—Mr. Haworth has described an insect under the name of Noctua albidilinea, which he states to be of the size and general form of N. Brassicæ, the fore wings being blackish coloured, with the ordinary stigmata, and a very deeply dentated white striga close to the posterior margin, as in the Brocade moths. Mr. Stephens considers it as a variety of M. Brassicæ.

SPECIES 7.—MAMESTRA ALBICOLON. Plate XXXVI., Fig. 10.

Synonyme.—*Noctua albicolon*, Ochsenheimer; Treitschke; Hübner; Stephens; Ill. Haust., 2, pl. 24, fig. 3; Wood, Ind. Ent., pl. 256.

This very distinct but dull-coloured insect measures about 1¾ inch in the expanse of the fore wings, which are of a greyish-brown colour, mottled with darker shades, indicating, but not very clearly, the situation of the ordinary strigæ, the costa being also spotted as usual. The two ordinary stigmata are slightly paler than the

rest of the wing, with a dusky margin, the supplemental one being almost obliterated; the posterior one marked at its hinder outer angle with two distinct, shining, whitish specks. Beyond this is the curved striga, formed of a geminated row of dusky arches, followed at some distance by the subapical striga, which is formed of a row of interrupted, scarcely angulated, or waved yellowish spots. The hind wings are ashy ochre-coloured, with the margin darker. Found in Cumberland, by Mr. Weaver, in August.

SPECIES 8.—MAMESTRA CHENOPODII. PLATE XXXVI., FIG. 13, 14.

SYNONYMES.—*Noctua Chenopodii*, Wien. Verz.; Fabricius; Hübner; Treitschke; Haworth; Albin, pl. 29, fig. 44 c—d; Stephens; Wood, Ind. Ent., pl. 12, fig. 257.

This common species measures rather less than $1\frac{1}{2}$ inch in the expansion of the fore wings, which in their general style of colouring closely resemble the last-described species, being of an ashy-brown colour varied with dark shades, and having the various stigmata and strigæ distinct, although not brightly coloured; the costa is marked with various dusky dots, as well as with several pale specks towards the apex, as in the majority of the allied species. The anterior stigma is small, and edged with a black ring; the outer one is dusky, margined with black, and ashy-coloured, and the supplemental stigma is present, and with a black margin; beyond the second stigma is a pale striga edged within with a curved row of blackish lunules, and there is a very distinct, whitish, slender, subapical, striga, which is very strongly dentate in the middle; the margin itself is marked with a row of small black dots; the hind wings are pale, dirty ashy-coloured at the base, with a central dot; the veins and the posterior margin dusky.

The caterpillar is green, with a darker dorsal longitudinal stripe, and an interrupted red line at the side; it feeds on various culinary vegetables in the autumn; the moth appearing in the middle of the following summer, being one of our most abundant insects.

SPECIES 9.—MAMESTRA ANCEPS. PLATE XXXVI., FIG. 15.

SYNONYME.—*Mamestra anceps*, Duponchel, vol. vii., part 1, plate cvii., fig. 5.

The specimen which Mr. Stephens has allowed us to figure from his cabinet, and which he considers to be specifically identical with the anceps of Duponchel, measures $1\frac{2}{5}$ inch in the expanse of the fore wings, which in their colours and the disposition of their markings very much resemble those of M. albicolon, being of a dingy greyish-brown colour, considerably mottled with darker shades; the basal striga indicated by a paler double-curved bar, edged with small black curves; the other strigæ are almost obsolete, except the apical one, which is pale, narrow, and dentated, and not exhibiting the strong angulations in the middle, with several conical darker patches resting upon it within in the middle. The anterior stigma is almost obsolete, with a black oval ring behind it, indicating the supplemental stigma; the posterior stigma is ear-shaped and pale, with a brown crescent in the middle, its outer part being white. The apical margin has a row of small black dots, preceding the cilia. The hind wings are pale grey at the base, with a broad dusky margin preceded by a slender dusky stripe beyond the middle; and with a central lunule.

The specimen in Mr. Stephens's collection was taken at Colchester by Mr. Barnes.

SPECIES 10.—MAMESTRA PERSICARIÆ. PLATE XXXVI., FIG. 11, 12.

SYNONYMES.—*Noctua Persicariæ*, Linnæus; Albin, pl. 177, fig. a—d; Harris, Aurelian, pl. 24, fig. a—e; Hübner; Donovan, 9, pl. 317. | Haworth; Treitschke; Stephens; Wood, Ind. Ent., pl. 12, fig. 258. *Phalæna sambuci*, Hufnagle.

This very distinct, handsome, and abundant species measures from $1\frac{1}{2}$ to $1\frac{3}{4}$ inch in the expansion of the fore wings, which are of a shining black colour, with the costa marked with several darker spots, and the disc varied

with the rudiments of the ordinary strigæ. The anterior stigma is edged with a dark black ring, having a minute pale speck at its base, and behind it is the rudimental supplemental stigma; the posterior stigma is large and ear-shaped, of a pure white colour, the centre marked with a fulvous lunule, the costa in front of it bearing a yellowish patch. The subapical striga consists of a waved row of small interrupted dots, each bearing a black wedge-shaped mark on the inside; the margin itself bears a series of black dots; the hind wings are dirty ashy-coloured at the base; the margin broadly dusky, as well as a central spot and the nervures, with a pale subapical striga; the cilia pale.

The caterpillar is variable in its colours, being sometimes pale livid brown, with dark green markings, or greenish, with darker markings; it has a white dorsal line, and the extremity of the body is angulated above; it feeds on elder, dwarf sun-flowers, marigolds, etc., in the autumn, and the moth, which is extremely common, appears in June.

DESCRIPTION OF PLATE XXXVII.

INSECTS.—Fig. 1. Apamea Fibrosa, male (the crescent). 2. A female variety.
" Fig. 3. Apamea Nictitans (the golden ear). 4. A dark variety.
" Fig. 5. Apamea Unanimis (the uniform rustic).
" Fig. 6. Apamea Seculina (the small clouded brindle).
" Fig. 7. Apamea Oculea (the common rustic). 8 and 9. Common varieties.
" Fig. 10. Apamea Ophiogramma (the double-lobed).

PLANT.—Fig. 11. Iris fœtidissima (the fœtid Iris).

A. Unanimis, Nictitans, and Oculea and varieties, are from the cabinet of Mr. H. Doubleday. A. Seculina and A. Ophiogramma are from specimens in the British Museum; and the varieties of A. Fibrosa from the cabinet of Mr. Bentley.

The banded variety of A. Fibrosa occurs both in the male and female, and there are some differences of character which seem almost sufficient to make it a distinct species; one of which may be observed in the fringe of the anterior wings, which in the banded variety is very narrow, and of a pale cream colour, whilst in the other it is much broader and brown. However, as every intermediate gradation, from those having a light band, to those that are entirely destitute of it, are occasionally found, it appears impossible to consider them distinct.

I am unable to give the caterpillars of any of these insects, or those in the succeeding plate, from an authentic source, and therefore hope that some of our subscribers in favourable localities will endeavour to collect some and forward them to us for the purpose of being figured in a supplemental plate. H. N. H.

APAMEA, TREITSCHKE, GUENÉE (ET HYDRÆCIA, GUEN.)

The species of which this genus is composed are of a moderate size, and generally of very dusky colours; the fore wings with the apical margin slightly denticulated, and with the posterior stigma very conspicuous; the antennæ are filiform or slightly crenulated in the males; the palpi scarcely extend beyond the head, and are but little elevated; the terminal joint short and naked; the thorax with a small bifid crest behind the collar, and another at the hind part, where it is united to the abdomen; the head has a thick tuft of scales on the crown, and the abdomen is tufted down the back; the caterpillars are smooth, naked, cylindrical, with a moderately large head; they are pale-coloured, and longitudinally striped; they feed upon low plants and grasses, and form slight cocoons of leaves or moss on the surface of the ground, when about to undergo their transformations; other species descend into the ground. They are æstival in their appearance in the perfect state.

SPECIES 1.—APAMEA FIBROSA. PLATE XXXVII., FIG. 1.

SYNONYMES.—*Noctua fibrosa*, Hübner; Stephens; Guénée; Doubleday; Wood, Ind. Ent., pl. 12, fig. 263.
Noctua lunina, Haworth.
Noctua leucostigma, Hübner; Oschsenheimer (variety).

This is the largest species of the genus, differing also from the other species in several respects, whence Guénée makes it the type of his separate genus Hydræcia; the expansion of the fore wings varies from $1\frac{1}{3}$ to

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1⅝ inch; they are of a pale castaneous colour, with the posterior margin brown, and with a large angulated fascia-like dark blotch in the middle, in which are placed the stigmata, being towards the fore part of the blotch, which does not extend either to the fore or hind margin; the anterior stigma is rounded with a pale margin which alone renders it conspicuous, being, indeed, occasionally almost obliterated; the posterior stigma is lunate and white, with the centre rather greyish; the apical margin has a slender dusky brown fascia, and occasionally the basal part of the wing is almost concolorous with the centre part and the apical portion with a broadish white fascia, and sometimes almost uniformly pale brown; along the apex is a row of black dots. The abdomen and hind wings are brown.

The caterpillar is of a dirty whitish colour, with a brown head, and the back reddish-brown, with some dusky spots. It feeds on the Iris pseudacorus. The moth is very local. It was found in profusion at Whittlesea Mere, in July, 1822; and Mr. Douglas has taken it, feeding on sugar placed as a bait on fruit-trees, at the beginning of August.

SPECIES 2.—APAMEA NICTITANS. Plate XXXVII., Fig. 3, 4.

Synonymes.—*Phal. Noct. nictitans*, Linnæus; Treitschke; Stephens; Wood, Ind. Ent., pl. 12, fig. 264.
Noctua chrysographa, Wien. Verz.; Hübner.
Noctua auricula, Haworth; Donovan, 12, pl. 397, fig. 3.
Noctua cinerago, Fabricius.
Noctua erythrostigma, Haworth (variety).
Hydræcea nictitans, Guénée; Doubleday.
Luperina (†††††††) *nictitans*, Boisduval.

This species measures from 1⅛ to 1⅓ inch in the expanse of the fore wings, which are of a reddish-brown colour, obsoletely shining with a golden tinge in certain lights, with rather obsolete, undulating, or flexuose strigæ, six in number and nearly equidistant, but generally more or less obsolete; the anterior stigma is small, round, and obscurely golden brown, or obsolete; the posterior one large, reniform, and of a golden white tint, inwardly margined with brown; along the apical margin of the wing is a row of black dots, the hind wings are of a blackish tinge, with brown ciliæ. Intermediate varieties occur, some being of a reddish-grey colour, with the strigæ more distinct, and both the round and kidney-shaped stigmata of a reddish colour; the anterior stigma is, however, often indistinct.

This is by no means a common species, especially near London. It has been taken near Margate by Mr. Hatchett, near Birch Wood, in Devonshire, the New Forest; taken also on Putney Heath from the flowers of lime-trees, as well as in the Isle of Arran. It appears in the winged state in the months of July and August.

SPECIES 3.—APAMEA OCULEA. Plate XXXVII., Fig. 7, 8, 9.

Synonymes.—*Phal. Noct. oculea*, Linnæus; Haworth; Stephens; Wood, Ind. Ent., pl. 12, fig. 267.
Phal. Noct. nictitans, Villers.
Noctua didyma, Esper; Ochsenheimer; Treitschke; Stephens; Wood, Ind. Ent., pl. 12, fig. 266.
Noctua nictitans, Esper.
Noctua lugens, Haworth.
Noctua I-niger, Haworth; Stephens, Ill.; Wood, Ind. Ent., pl. 12, fig. 268.
Noctua rava, Haworth; Stephens, Catal. H., p. 86.
Noctua furca, Haworth; Stephens; Wood, Ind. Ent., pl. 13, fig. 271.

This very variable species measures from 1⅛ to nearly 1½ inch in the expanse of the fore wings which are subdenticulated at the apex. In some specimens (as in our fig. 8) they are nearly of a uniform mouse-brown colour, with the slightest indication of the strigæ. In others (as in our fig. 9) they are of a rich dark chocolate-brown, and shining, with still less distinct traces of the strigæ, except the wings be held in a certain position, when they may be perceived of a duller hue than the rest of the wings; whilst some (as in our fig. 7) have the fore wings much varied along the inner margin, and beyond the posterior stigma, with a pale luteous buff. In almost all these varieties the posterior stigma is more or less distinct and accompanied by a white dot, and the undulating subapical striga is succeeded by a darker tinge, forming an irregular margin along the apex of the wing.

On the under side, the hind wings are marked with a central dark dot, and a slender, dusky striga half-way between it and the apex; the costa of all the wings on this side have a more or less rosy tinge. Amongst other varieties must also be mentioned the Noctua I-Niger of Haworth, which has the fore wings of a greyish or brownish tinge, with a central bar varied with brown, fuscous and ashy, in which the ordinary stigmata and a black line, like the roman I, are placed; there are also two other small black lines at the base; the apical margin with two subconfluent roundish patches and the reniform stigma ochre-coloured; in other specimens it is clear white, and in others yellowish.

This insect is very abundant round London and in various other parts of the kingdom at the end of July and beginning of August.

SPECIES 4.—APAMEA UNANIMIS. PLATE XXXVII., FIG. 5.

SYNONYME.—*Noctua unanimis*, Hübner? Treitschke; Guénée; Boisduval.

This species measures about 1⅓ inch in the expanse of the fore wings, which are of an obscure greyish-brown colour, clouded with dusky shades and very indistinct strigæ; the costa is marked with several dusky dots arranged in pairs, indicating the origin of the strigæ, of which the second and third are pale and rather more distinct; the stigmata are almost concolorous, being indicated by a slender dusky border; the subapical striga is slightly denticulated, but is not followed by the dark apical clouding; along the margin itself is a row of dusky dots. The hind wings are dull brown, with the edge darker.

Mr. Doubleday gives this as a species doubtfully introduced into the English lists. A specimen has been stated to have been captured by Mr. Dale in Scotland.

SPECIES 5.—APAMEA SECALINA. PLATE XXXVII., FIG. 6.

SYNONYMES.—*Noctua secalina*, Hübner(?) Haworth; Stephens; Wood, Ind. Ent., pl. 12, fig. 265. | *Noctua leucostigma*, Esper. *Noctua Lambda*, Vieweg.

This species measures from 1⅓ to 1½ inch in the expanse of the fore wings, which are of a pale greyish-buff, varied with brown clouds; in the middle of the wing is an abbreviated dusky fascia, in which are placed the stigmata, the anterior one inclining obliquely towards the costa, with a white margin; the posterior, reniform and brown, with a broad white margin; at the base of the wings are several dark streaks, the hind one of which is united to an angulated striga; beyond this is also a third striga, which is anteriorly marked with dark angulated spots; along the costa are several dark dots: the subapical striga is pale, and very much undulating, bearing several dark arrow-headed dots on its inner margin, and succeeded by a dusky margin with a row of dark dots; the hind wings are pale brown with a dusky border. Varieties occur with a black stripe in the middle of the central fascia, as in the above-mentioned variety of Apamea oculea, named I-niger; the stigmata also vary in size, and in being paler-coloured than usual, and the black stripe more distinct.

This is a much earlier species than the preceding, being found in marshy places, such as Battersea-fields, Deptford, etc., in June, and Mr. Douglas has taken it as early as May 27.

SPECIES 6.—APAMEA OPHIOGRAMMA. PLATE XXXVII., FIG. 10.

SYNONYMES.—*Noctua ophiogramma*, Esper; Hübner; Ochsenheimer; Stephens; Wood, Ind. Ent., pl. 13, fig. 272.
Noctua biloba, Haworth.

This very distinct species measures rather more than 1¼ inch in the expanse of the fore wings, which are of a greyish-buff colour, with a very large patch of blackish hue, occupying the whole of the costa except at the tips, and which is dilated towards the hinder margin, where it forms two lobes, in each of which is placed one of the

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stigmata; the anterior one round, with a pale margin, and the outer one reniform and greyish in colour; there is also a spear-like, dusky patch towards the anal angle, and an angular one in the middle of the apical margin; the hind wings are of a dirty buff colour, with an obscure transverse fascia. This is not a common species, but is occasionally taken in marshy districts near London.

DESCRIPTION OF PLATE XXXVIII.

INSECTS.—Fig. 1. Miana literosa (the rosy minor).
" Fig. 2. Miana strigilis (the marbled minor). 3. The variety called Latruncula. 4. The variety called Æthiops (the blackamoor).
" Fig. 5. Miana humeralis (the cloaked minor). 6. A pale variety. 7. The variety called Terminalis. 8. A pale variety. 9. The variety called Rufuncula.
" Fig. 10. Miana fasciuncula (the middle-barred minor).
" Fig. 11. Miana pulmonariæ.
" Fig. 12. Miana minima (the least minor).
" Fig. 13. Celæna renigera (the kidney spot minor).
" Fig. 14. Celæna Haworthii (Haworth's minor). 15. The variety called Tripuncta. 16. The variety called Lancea, of which latter there is another still more obscure variety, called Hibernica.

PLANT.—Fig. 17. Peucedanum palustre (milk parsley).

The whole of the above insects, with the exception of M. pulmonariæ, from the collection of Mr. H. Doubleday, and M. minima, from the collection of Mr. Newman (the original specimen of Haworth), are from the cabinet of Mr. Bentley. Mr. B., who has perhaps had more experience in the arrangement of this and the neighbouring groups than any other British Entomologist, considers the genus Miana to stand as in the above description of our Plate 18, viz., four distinct species, Literosa, Strigilis, Humeralis, and Fasciuncula; with the addition, perhaps, of Pulmonariæ and Minima; but it is very doubtful whether the two insects figured under those names are properly placed in this genus. Of the genus Celæna, the above arrangement is also according to the views of Mr. Bentley; he makes only two species, Renigera and Haworthi, which may probably be eventually reduced to one, as it is considered doubtful whether the insect upon which our claim to Renigera, as a British species, is founded, may not be a foreign specimen. H. N. H,

MIANA, STEPHENS. APAMEA, BOISDUVAL.

This genus comprises some of the most minute species of the present family, distinguished by their filiform antennæ; those of the males being rather thickened, and finely ciliated; the palpi short, porrected obliquely, the terminal joint exposed, the head with a frontal crest, the body slender, thorax rounded, the back being strongly crested, the wings of moderate size, with dark shining patches, entire edges, and nearly obsolete stigmata. The caterpillars are small and vermiform, destitute of bright colours, with pale lines along the body, and which feed within the stems of grasses, near the roots; the chrysalides are generally buried beneath the surface of the earth, and the perfect insects, which appear in the hottest months of the year, are to be found sitting on the trunks of trees. The species are extremely liable to vary.

SPECIES 1.—MIANA LITEROSA. PLATE XXXVIII., FIG. 1.

SYNONYME.—*Noctua literosa*, Haworth; Stephens, Ill. Haust. 3, pl. 25, fig. 1; Wood, Ind. Ent., pl. 13, fig. 273.

This species measures about five-sixths of an inch in the expanse of the fore wings, which are of a glaucous colour; the base considerably darker, with a flexuous posterior striga of a rosy hue, followed by a pale one, and with various black markings in the middle of the wing, resembling letters; the posterior stigma is placed about the middle of the wing, but is almost obsolete, being distinguished only by its broken dark edging on the inside, which is extended backwards, and forms the letter-like marks above mentioned, being united with the angulated posterior dark, dusky portion of the second ordinary striga; the black marks are, however, occasionally obsolete. The

cilia is brown with a rosy tinge, and the hind wings are pale brown, with the margin more dusky. Rare, but found in Kent and Essex, as well as in Norfolk, at the end of July.

SPECIES 2.—MIANA STRIGILIS. PLATE XXXVIII., FIG. 2, 3, 4.

SYNONYMES.—*Phalæna Noctua strigilis*, Linn.; Fabr.; Treitschke; Haworth; Stephens; Wood, Ind. Ent, pl. 13, fig. 274.

Noctua præduncula, Wien. Verz.; Hübner; Haworth.

Noctua latruncula, Haworth; Hübner; Stephens, Wood, Ind. Ent., fig. 275.

Noctua ærata, Esper.

Noctua meretricula, Borkhausen.

Noctua Æthiops, Haworth; Stephens; Wood, Ind. Ent., fig. 276.

This very variable species measures about an inch in the expanse of the fore wings, which in some individuals are much mottled with grey, black, and olive-brown, especially towards the base; the apical portion, beyond the third ordinary striga, being almost white, except along the margin. Such specimens constitute the typical variety N. strigilis. Others, having the wings almost of a uniform reddish-brown, with darker markings, the central portion being darkest, have been named N. latruncula; whilst some are so uniformly brownish-black, that they have obtained the name of N. Æthiops. These leading varieties (to which a number of intermediate ones might be added) are represented in our figures 2, 3, and 4. In all these we find the basal portion exhibiting indications of the two anterior strigæ, more or less distinct, and edged with black; the costa is also varied with darker dots. The stigmata are pale and distinct, the space between them dark, with black lines, and behind them is a forked black line, connecting the second and third strigæ, the latter being much curved, and formed of a series of minute black arches. The fourth striga is distinct and undulating, and the margin marked with a row of black dots. In the dingy varieties the terminal striga is of a rusty tint. This is rather a common species, flying in the months of June and July, and being widely dispersed. The caterpillar is described as ashy-white, with a dorsal and two lateral lines of violet and black spiracles, with the head small and yellowish-brown. It has been found by Mr. H. Doubleday, who at first regarded it as that of one of the Tortrices, which it much resembles; they feed on grass, nettles, sallows, etc., and produce the different varieties described above, proving the identity of the species.

SPECIES 3.—MIANA HUMERALIS. PLATE XXXVIII., FIG. 5, 6, 7, 8.

SYNONYMES.—*Noctua humeralis*, Haworth; Stephens; Wood, Ind. Ent., pl. 13, fig. 277.

Noctua furuncula, Hübner; Treitschke; Duponchel; Boisduval; Doubleday.

Noctua bicoloria, Borkhausen.

Noctua terminalis, Haworth; Stephens; Wood, Ind. Ent., pl. 13, fig. 278.

Noctua ærata, Esper (variety).

This is another extremely variable species, generally rather smaller than the preceding, measuring from ten to twelve lines in the expansion of the fore wings, which in the typical variety have the basal half brown-coloured or blackish, with clouded markings, whilst the apical portion is ashy-white, with the apical margin brown, through which runs the terminal undulating striga; in this variety the antennæ are brown, and the posterior wings brown, with the base ashy. In other varieties the general colour of the wing is more uniform, and either pale reddish-brown or dull straw-coloured, with the central portion darker and bearing the characteristic markings; others, again, have the wings reddish, with the apical margin blackish and undulated, and with reddish antennæ; in all, the anterior stigma is remote from the base of the wing, and very oblique; and the posterior one is of moderate size, and is generally followed, especially towards the hinder margin of the wings, with a pale striga, and there is a marginal row of black dots: the hind wings vary in tint, according to that of the fore wings, but have the margin dusky.

This is a rather common species, especially along the southern coast of England and the Isle of Wight, where I have taken the typical variety in profusion. It occurs also in other and distant parts of the country.

SPECIES 4.—MIANA FASCIUNCULA. Plate XXXVIII., Fig. 10.

Synonyme.—*Noctua fasciuncula*, Haworth; Stephens; Wood, Ind. Ent., pl. 13, fig. 280.
Miana rununcula, Dofzel?

This species measures rather less than an inch in the expanse of the fore wings, which are of a reddish colour, with a broad, central, dusky bar, interrupted by the stigmata, and very much narrowed behind towards the hinder margin, where it is obsoletely margined both before and behind with whitish; the apex is preceded by a slender, russet-coloured, waved striga; and the ciliæ are reddish-brown. The hind wings are blackish, with white or ashy ciliæ. It varies occasionally by having the fore wings much paler coloured, of a reddish hoary tinge, and with a reddish-brown central fascia, bearing a transverse blackish streak, connecting the second and third strigæ. This is a rather common and widely-dispersed species.

Miana rufuncula, Haworth, Stephens, Wood, Ind. Ent., pl. 13, fig. 279, and our figure 9, is most probably a very pale variety of this or the preceding species; it measures about an inch in expanse. The fore wings are entirely red, with two paler straight strigæ in the middle, and a waved one near the apex; but these strigæ are sometimes almost obsolete, and there is a marginal series of triangular dark dots. The hind wings are reddish-brown, with the ciliæ red.

SPECIES 5.—MIANA PULMONARIÆ. Plate XXXVIII., Fig. 11.

Synonyme.—*Noctua Pulmonariæ*, Hübner; Duponchel; Boisduval (Var. A. furuncula).

This species measures about an inch in the expanse of the fore wings, which are of a pale, ochreous-buff colour, slightly clouded with brown; an abbreviated dusky striga before the middle of the wing, and a dusky cloud across the middle, enclosing the second stigma, followed by a curved row of dusky points on the veins, indicating the third striga, beyond which is another slender, dusky, curved striga, dilated on the costa; the extreme apex slightly dusky, with a row of small dark dots; the hind wings ochreous-brown, with a pale bar across the middle, but interrupted, followed by another entire one.

Taken by Mr. H. Doubleday at Epping, and by Mr. Douglas near Warley, Essex, in July. Mr. Bentley also possesses a specimen. The insect appears to be allied to the genus Acosmetia.

SPECIES 6.—MIANA MINIMA. Plate XXXVIII., Fig. 12.

Synonyme.—*Noctua minima*, Haworth; Stephens; Wood, Ind. Ent., pl. 13, fig. 281.

This is the most minute of all the British species of Noctuidæ, measuring only $\frac{2}{5}$ or $\frac{3}{4}$ of an inch in the expanse of the fore wings, which are of a reddish-ashy colour, with a straight white striga placed before the middle of the wing, and intersected by fine black lines. The two ordinary stigmata are round and like spots, separated by a brown patch, which reaches the costa, followed by a curved white striga, similar to the preceding one, and, lastly, a broader-waved pale striga near the apex of the wing; the ciliæ ashy; the hind wings brown, with white ciliæ. Very rare; taken in Darenth Wood, Kent, and Whittlesea Mere.

CELÆNA, Stephens.

This genus, which is united with the preceding by several recent authors, is characterised by its founder, Mr. Stephens, by its broader fore wings, with the posterior stigmata very conspicuous, and, with the adjoining veins, pale coloured; the thorax not crested; the palpi densely squamose, with the terminal joint obtuse; the head with a dense tuft of hair on the crown.

SPECIES 1.—CELÆNA HAWORTHII. PLATE XXXVIII., FIG. 14, 15, 16.

SYNONYME.—*Apamea Haworthii*, Curtis, Brit. Ent., pl. 260; Steph., Ill. Haust. 3, pl. 25, fig. 3; Wood, Ind. Ent., pl. 13, fig. 283.

This species measures about 1¼ inch in the expanse of the fore wings, which are of a rosy-brown colour, with three yellowish spots on the costa, and three more minute ones towards the tip; the base of the wing with several black longitudinal lines; the characteristic portion of the wing is bounded by two waved, narrow, whitish, transverse lines slightly edged with black; the anterior stigma is minute, and rounded with a black hook behind it; the outer stigma is cream-coloured and ear-shaped, with a dusky line within; the central furcate vein is in this portion of the wing cream-coloured; the subapical striga is yellowish and dentated, bearing three short black conical spots within: a black series of dots at the base of the ciliæ; hind wings yellowish-brown, with the margin darker, and with a lunular dusky line in the middle.

The insect has been taken at the end of July and beginning of August, at Whittlesea Mere and Windermere, by Mr. Dale; also by Mr. Cook, near York, in plenty.

Celæna hibernica, Stephens; Wood, Ind. Ent., pl. 13, fig. 285, is considered by Mr. H. Doubleday to be a variety of the preceding species; the fore wings in this are reddish-brown, without any black lines at the base; the strigæ on each side of the characteristic portion of the wing are present, followed by a whitish fascia, on which is a paler dentate striga; the anterior stigma generally obsolete; on the hinder margin is an interrupted black line; the pale colour of the central veins does not extend so far as in the preceding, from which this accordingly differs in the more uniform colours, and the want of the black markings. Found near Dublin.

Celæna lancea, Stephens; Wood, Ind. Ent., pl. 13, fig. 284, is given in the "Systematic Catalogue" as a probable variety of the preceding, from which it differs chiefly in its smaller size (measuring only an inch in expanse), nearly uniformly-coloured fore wings, with the scarcely waved posterior strigæ and paler hind wings. Taken near Whittlesea Mere, etc.

Apamea tripuncta, Curtis (B. E. 260 b, without description), is most probably another variety of this species, having both the stigmata distinct and pale, as well as a patch resting upon the subapical striga near the costa of the fore wings. Taken at Horning, in Norfolk, at the beginning of September.

SPECIES 2.—CELÆNA RENIGERA. PLATE XXXVIII., FIG. 13.

SYNONYME.—*Celæna renigera*, Stephens, Ill. H. 3, pl. 25, fig. 2; Wood, Ind. Ent., pl. 13, fig. 282.

This species measures 1⅓ inch in the expansion of the fore wings, which are of an ashy-brown colour, with a slight greenish tinge; the base is pale, varied on the costa and hind margin with dark spots, and with a dusky lineola; the central characteristic part of the wing is darker brown, narrowed behind, edged with a dark or blackish line, both before and behind, the latter curved behind the outer stigma, the anterior stigma being minute and nearly straight; behind which is a supplemental stigma edged with black; the outer one is yellowish and reniform. The apical portion of the wings dark, with the subapical striga obsolete; the hind wings are whitish, with a dusky margin. Specimens of this insect existed in some of the old cabinets, and were supposed to have been taken near London; but we are assured by Mr. Doubleday that the species is a native of North America.

DESCRIPTION OF PLATE XXXIX.

INSECTS.—Fig. 1. Lycophotia porphyrea (the true lover's knot). 2. The Caterpillar.
" Fig. 3. Achatia spreta (the pine beauty). 4. The Caterpillar.
" Fig. 5. Actebia præcox (the Portland moth).

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INSECTS.—Fig. 6. Trachea atriplicis (the wild arrach). 7. The Caterpillar.
" Fig. 8. Valeria oleagina (the green brindled dot). 9. The Caterpillar.
" Fig. 10. Miselia bimaculosa (the double spot brocade).
" Fig. 11. Miselia templi (the brindled ochre).
" Fig. 12. Miselia oxyacanthæ (the green brindled crescent).
" Fig. 13. Miselia aprilina (the marvel du jour). 14. The Caterpillar.
" Fig. 15. Miselia compta (the marbled coronet).
" Fig. 16. Miselia albimacula (the white spotted coronet)

PLANT.—Fig. 17. Erica tetralix (the cross-leaved heath).

Figs. 1, 3, 5, 6, 8, 10, 15, and 16 are from specimens in the British Museum; 11 is from a specimen in the cabinet of Mr. Bentley, and 12 and 13 are from specimens furnished me by Mr. H. Doubleday. There is a dark variety of M. Oxyacanthæ, which, however, I have not thought necessary to add to this plate, as the remarkable serpentine white line near the posterior angle of the fore wing is always sufficiently clear to identify the species; indeed all the other markings remain perfectly defined, though the general deep brown colour, and the absence of the glittering green scales, or some of the principal nervures, give it a different aspect at a first glance.

The caterpillars are all from Hübner. H. N. H.

LYCOPHOTIA, HÜBNER. (SCOTOPHILA, STEPH. NEC BOISD.)

The species upon which this genus is founded has been much misunderstood as to its natural relations. By several modern authors it has been united with Achatia spreta (piniperda Kob), from which it was generically separated by Mr. Stephens. By Boisduval it is united, together with A. rectangula, plecta, musciva, and some others, into a genus under the name of Chersotis; whilst Guénée introduces it into his genus Noctua, corresponding, for the most part, with our genus Graphiphora; and it is impossible, on comparing our figures of the larvæ of these groups, not to be convinced that it is certainly allied to the Hadenæ and Graphiphoræ. As there is much discrepancy in the employment of the generic name Scotophila, by Hübner, Boisduval, and Stephens, the name having been taken from a species (Noctua livida, Fab.; N. scotophila, Esper, which ought to be retained for its type), I have employed Hübner's name, Lycophotia. The thorax is not crested; the antennæ of the males are slightly pectinated; the wings are entire and deflexed; and the palpi, with the basal joints clothed with long scales, and the terminal joint naked and subacute. The caterpillar feeds upon heath, and the chrysalis is enclosed in cocoons of earth and dry leaves, at the foot of the plant on which the caterpillar fed.

SPECIES 1.—LYCOPHOTIA PORPHYREA. PLATE XXXIX., FIG. 1, 2.

SYNONYMES.—*Noctua porphyrea*, Wien. Verz.; Hübner; Stephens; Wood, Ind. Ent., pl. 13, fig. 286.
Noctua picta, Fabricius.
Noctua concinna, Esper.
Noctua lepida, Esper.
Noctua birivia, Borkhausen.
Ph. Noct. varia, Villers.
Noctua Erica, Donovan, vol. x., pl. 360, fig. 1; Haworth; Harris Expos., pl. 5, f. 5.

This species measures rather more or less than an inch in the expanse of the fore wings, which are of a reddish-ash colour, clouded with blackish; the costa with alternate black and white dots; near the base of the wing is an undulated white striga, edged with black, bearing several short whitish dashes; the anterior stigma is small, round, and white; the outer one kidney-shaped and greyish, with a white border; there is also a teliform, supplemental, cinereous-coloured stigma, edged with black; the third striga is white, very much arched, and dentated with another series of white dashes next the apical margin, which has a row of black dots; the ciliæ are rufescent; the hind wings are ashy, with a marginal row of black dots. The caterpillar is brownish-buff, with longitudinal dusky lines at the sides, and pale diamond-shaped spots edged with dusky lines on the back. The perfect insect is found on heaths at the end of July, but is not common.

ACTEBIA, Stephens. (HAPALIA, Hb., Curt.)

The head, in the insect, which is the type of this genus, is thickly squamose; the thorax scarcely crested; the antennæ ciliated beneath in the males; the palpi short, with the terminal joint exposed and obtuse; the fore wings are narrow and truncated, the caterpillars naked and smooth, and the chrysalis subterranean. Boisduval places the typical species in his genus Spælotis, and Guénée in Agrotis!

SPECIES 1.—ACTEBIA PRÆCOX. Plate XXXIX., Fig. 5.

Synonymes.—*Phal. Noct. præcox*, Linn.; Haworth; Donovan, 6, pl. 213; Curtis, Brit. Ent., pl. 539; Steph., Wood, Ind. Ent., pl. 13, fig. 288. *Noctua præceps*, Hübner.

This handsome species measures about $1\frac{3}{8}$ inch in the expanse of the fore wings, which are of a brownish-green colour, with paler irrorations; the costa is spotted with small black and white dots; the first and second strigæ are distinct, pale, and much waved, edged with black denticulations; between them is a pale dot; the anterior stigma is roundish, with the centre reddish-brown edged with black, behind which is the oval supplemental stigma, partly edged with black; the outer stigma is large and ear-shaped, with greenish and black markings; between the stigmata is occasionally a brownish waved cloud; the pale waved subapical striga is preceded by a wide purplish-red stripe, interrupted by a white blotch on the costa; the extreme apex with a row of black dots; the hind wings are fulvous-brown.

The late Captain Blomer found the larvæ feeding on Galium verum, growing on the sand-hills at Appledore Burrows and Dawlish Warren (where it has since been taken by W. R. H. Jordan, Esq.), at the end of May, and who communicated a figure of one full grown to Mr. Curtis. The back is fulvous, with a slender white longitudinal stripe, irregularly edged with black; the sides of the body grey, with numerous black spots; the head pale brown, with white and black markings; and the neck grey. The moths appeared in the following August. It is a rare species, and was first found by the Duchess of Portland (who was a great collector of insects) in the Island of Portland. It has also been found on the sea-shore of Ireland, and in the north of England.

ACHATIA, Hübner. (TRACHEA, Ochs., Bdv., Guen.)

The only species included in this genus has the antennæ serrated beneath in the males; the head nearly concealed; the labial palpi very hairy, porrected horizontally, almost concealed, with the terminal joint scarcely distinct; the thorax is very densely hairy; the abdomen is short and thick; the fore wings obtuse and beautifully marked. The caterpillar is smooth and naked, of a green colour, with pale longitudinal stripes. It feeds on pine-trees, occasionally doing very great mischief. The genus is scarcely naturally located in its present situation.

SPECIES 1.—ACHATIA SPRETA. Plate XXXIX., Fig. 3, 4.

Synonymes.—*Bombyx spreta*, Fabricius; Panzer; Curtis, Brit. Ent., pl. 117.

Noctua piniperda, Kob; Esper; Stephens; Wood, Ind. Ent., pl. 13, fig. 287.

Phalæna Noctua Pini, Villers.

Noctua flammea, Wien. Verz.; Fabricius; Hübner.

Noctua ochroleuca, Hübner (variety).

This beautiful species measures from $1\frac{1}{8}$ to $1\frac{1}{2}$ inch in the expanse of the fore wings, which are of a fine ochre colour, varied with rich red or chestnut. The two basal strigæ are almost obsolete, the first occasionally appearing as an abbreviated pale transverse line; the stigmata are distinct and large, the anterior rather square and yellowish; the outer one oblique, with the centre ochraceous, followed by a much-waved and denticulated

whitish striga; the principal veins are whitish, which is the case with all of them towards the tip of the wing, where they intersect a rich, broad, rosy bar, preceding the subapical striga, which is almost obsolete. The hind wings are brown; the thorax rosy, with white markings. The caterpillar is green, with three slender, white, dorsal, longitudinal stripes, and a fulvous lateral one. The moth was first taken by Mr. Stephens in 1810, near Hertford. It has since been found in Surrey, Kent, Norfolk, Yorkshire, etc.; Chat-moss, Mr. Edleston.

TRACHEA, Ochs., (nec Boisduval. HADENA, p. Guén., Boisd.)

The only species in this genus, as restricted by Mr. Stephens, has the head densely squamose, the thorax quadrate, with a bifid crest in the middle, the segments of the abdomen tufted above, the fore wings elongate-triangular; the antennæ slender in both sexes; the palpi densely squamose; the terminal joint distinct, and knob-like. The caterpillar is smooth, naked, and coloured, with the penultimate segment angulated above, as in the Mamestræ.

SPECIES 1.—TRACHEA ATRIPLICIS. Plate XXXIX., Fig. 6, 7.

Synonymes.—*Phal. Noct. atriplicis*, Linnæus; Wilkes, 3, pl. 2; Donovan, vol. 8, pl. 262, fig. 1; Haworth; Stephens; Curtis, Brit. Ent., pl. 431; Wood, Ind. Ent., pl. 13, fig. 289.

This very beautiful insect measures about 1¾ inch in the expanse of the fore wings, which are of a somewhat ashy tint, clouded with darker brown shades, and varied with yellow or greenish markings. Near the base of the wing is the first pale striga, edged with black, and crenated; beyond which towards the hind margin is a large pale patch with a dusky centre; the second striga is transverse and very undulated, succeeded by the characteristic portion of the wing, the ground of which is rich dark brown; the anterior stigma is small and annular, immediately behind which is a small supplemental stigma, margined with black, on which and the preceding rests a very distinct whitish oblique central patch; the outer stigma is very large and luteous or greenish, with the centre varied with dusky; the third striga is very much curved and denticulated, slender and pale, followed by a various coloured space, which is pale green or luteous towards the anal angle; the subapical striga is slender, pale, and much waved, followed by a darker stripe, the apex marked with a double row of small black marks. The hind wings are brown, with the margins darker coloured.

The caterpillar is dark green, with a dorsal and lateral stripe of black, which is also the colour of the incisions of the body, a bright fulvous stripe running along the spiracles. One figured by Rösel, is, however, of a flesh colour; it feeds on Atriplex hortensis, Rumex acetosa, etc. The perfect insect is rare, but has occurred in distant parts of the country, near London, Wisbeach, Cheltenham, in June, and September.

VALERIA, Germar, Steph., Guén. METELLA pars, Boisduval.

The typical and only British species of this genus is at once distinguished from all the other Noctuidæ by having the antennæ in both sexes bipectinated (more strongly in the males); the tips of the pectinations thickened; the palpi have the terminal joint exposed and elongate; the thorax is robust and slightly crested; the abdomen thick, and the fore wings notched along the apical margin. The caterpillar is naked, having only a few scattered hairs; it feeds on trees.

SPECIES 1.—VALERIA OLEAGINA. Plate XXXIX., Fig. 8, 9.

Synonymes.—*Bombyx oleagina*, Wien. Verz.; Fabricius; Hübner; Haworth; Sowerby, British Miscell., 1, pl. 37; Donovan, vol. 13, pl. 439; Stephens; Wood, Ind. Ent., pl. 13, fig. 290.

This fine species measures about 1¾ inch in the expanse of the fore wings, which are of a brown colour, much

varied with green, which is disposed along the main veins of the wings; the costa is marked near the tip with several whitish dots; the two anterior strigæ are obsolete, the anterior stigma is round, brown with a pale margin, the outer stigma is large, broad, and white, with a slight shade of brown at each end, beyond which appears the slender, black, denticulated, and much waved penultimate striga, the apical portion being much varied with brown and green. The hind wings are whitish, with a broad dusky border, in which is a pale subapical striga.

The caterpillar is ashy, with red dots and black dentate streaks, and a red collar; it feeds on the blackthorn. The moth is of great rarity, but is very widely dispersed, having been taken near London, in Richmond Park, near Bristol, in South Wales, and in Scotland.

MISELIA, Treitschke.

The species which have been introduced into the present genus by English authors are by no means so uniform in their *habitus* or appearance as to render the group a fixed one as thus constituted; we accordingly find the recent continental authors are not in accord with our own, adopting indeed the generic name, but introducing some other species, whilst some of ours are removed by them to other groups. The antennæ in our typical species are robust, and more or less serrated beneath in the males; the palpi short and obliquely porrected, with the terminal joint not concealed by the scales of the preceding; the head with a crest; the thorax large, and also crested or thickly squamose; and the abdomen large and tufted; the wings are but slightly deflexed when at rest, the anterior being strongly marked, and having the apical margin crenated. The caterpillars are naked, subdepressed, and varied with dark markings on the back, with the extremity of the body gibbose, or furnished with conical protuberances.

SPECIES 1.—MISELIA BIMACULOSA. Plate XXXIX., Fig. 10

Synonyme.—*Phalæna (Noctua) bimaculosa*, Linnæus; Hübner; Fabricius; Curtis, Brit. Ent., pl. 177; Wood, Ind. Ent., pl. 13, fig. 291.

This fine species measures two inches in the expanse of the fore wings, which are of a pale buff-coloured grey, minutely speckled; the fore margin, with about ten dark oblique dashes, an oblong-oval chestnut-coloured patch towards the base resting upon a dentate striga preceding the stigmata, which are large and pale-coloured, a very large supplemental one being placed behind the anterior one; beyond the stigmata is a curved and crenated striga of a brown colour, edged with pale tint, and followed by a few dark dots on the veins, and a waved interrupted submarginal striga. The hind wings are also pale, with two large dark patches, one in the middle and one near the anal angle. I believe this insect still remains unique in the British Museum, the specimen having been taken near Bristol. Boisduval gives August as the time of its appearance in the perfect state. The caterpillar, as figured by Hübner, is grey, with longitudinal dusky and whitish lines, each segment with two dark oval patches, each bearing a spiracle; the hind part of the body with two conical protuberances: it feeds on the elm.

SPECIES 2.—MISELIA OXYACANTHÆ. Plate XXXIX., Fig. 12.

Synonyme.—*Ph. (Noct.) Oxyacanthæ*, Linn.; Haworth; Donovan, 5, pl. 165: Wilkes, pl. 27; Harris, Aurelian, pl. 43, fig. d, f; Albin, pl. 14, fig. 19, a—d; Hübner; Stephens; Wood, Ind. Ent., pl. 13, fig. 292.

This species measures 1⅔ inch in the expanse of the fore wings, which are of a shining brown colour, varied along the margins and upon the veins with green scales. At the base of the wings is a black dash extending into the supplemental stigma, and running through the angulated striga at the base of this and the anterior stigma. All the stigmata are larger and paler coloured than the disk of the wings, with the edges within still paler; they are followed by a slender waved black line, which is conspicuously edged towards the inner margin

by a white abbreviated striga resting upon a dark brown patch; the apical portion of the wing is paler than the centre, and prettily mottled with brown and green patches, and several acute black marks towards the anal angle. The hind wings are pale brown, with slightly indented slender dusky streaks across them beyond the middle.

The caterpillar feeds on the whitethorn, and is found in May; it is of a brown colour, with the sides and belly luteous: it is varied with black and white, and has a protuberance near the extremity of the body. The moth flies in September and October, but is not an abundant though widely-dispersed species.

SPECIES 3.—MISELIA COMPTA. Plate XXXIX., Fig. 15.

Synonymes.—*Noctua compta*, Wien. Verz.; Fabr.; Hübner; Haworth; Stephens; Wood, Ind. Ent., pl. 13, fig. 294.
Ph. Noct. transversalis, Villers.
Miselia comta, Ochsenheimer.
Phal. Noct. X-scriptum, Sowerby, Brit. Misc., tab. 55.
Dianthœcia conspersa? Boisduval; Doubleday.

This species measures rather less than $1\frac{1}{2}$ inch in the expanse of the fore wings, which are of a brown colour, varied with white spots and black markings, the base and middle of the wing being more regularly fasciated with white, the anterior stigma forming part of the middle fascia, the space between the two ordinary stigmata being marked with a black N (or occasionally X); towards the apical margin is a very much waved and dentated striga, which is dilated at the apex into a small trilobed patch. The hind wings are brown, with the base paler. The caterpillar is grey, with a row of brownish spots on the back. It feeds on Lychnis dioica, and the moth appears in June; it is not a common species, although it has been occasionally found on palings at Darenth Wood, Kent.

SPECIES 4.—MISELIA ALBIMACULA. Plate XXXIX., Fig. 16.

Synonymes.—*Noctua albimacula*, Borkhausen; Treitschke; Stephens; Wood, Ind. Ent., pl. 13, fig. 304.
Noctua concinna, Hübner; Ochsenheimer; Curtis.
Noctua consorta, Hübner.
Noctua compta, Esper.

This species is about the same size as the preceding, with the fore wings of a rich, pinkish, olive-brown, varied with white spots and black markings; at the base of the wings is a white spot, through which runs the anterior dark striga; the second and third strigæ are white, and very much dentated, and edged with black; the anterior stigma is white, close behind which is a white patch, and the outer stigma is whitish, with a dusky centre; the subapical striga is white and undulated, and is followed by a slender, interrupted, dusky line; the cilia is white, spotted with black; the hind wings yellowish-brown, with a dark border, and two pale dots towards the anal angle. This species is also unique in the British Museum, the specimen having been found by the late Mr. Bydder on a post near Birch Wood, Kent. Boisduval gives June as the time of its appearance in the perfect state.

SPECIES 5.—MISELIA APRILINA. Plate XXXIX., Fig. 13, 14.

Synonymes.—*Ph. Noct. aprilina*, Linnæus; Haworth; Treitschke; Stephens; Wood, Ind. Ent., pl. 13, fig. 293.
Noctua runica, Fabricius; Hübner; Donovan, 10, pl. 354, f. 1.

This fine species measures about $1\frac{3}{4}$ inch in the expanse of the fore wings, which are of a very pale green colour, varied with black markings, the costa having about ten small ones placed more or less obliquely; there are several black patches at the base, followed by a nearly transverse white striga edged behind with black; the stigmata are white, with the centre clouded with greenish, and edged with black, the outer one being very much bent; an irregular and interrupted black fascia running between the stigmata, and extended to the hind margin of the wing; beyond the stigmata is a much curved row of slender white lunules, edged within with black, succeeded by a row of small, black, angulated marks, edged with white, and a marginal series of triangular

black dots; the hind wings are dark brown, with a dark spot in the centre, followed by a slender, black, transverse line, edged with whitish, and with a white subapical stripe. The thorax has two black arches in front.

The caterpillar is depressed, and of an ashy colour, with dark lines and marks on the back; the sides paler, with a darker line running along the spiracles; it varies, however, in its colouring, and feeds on various trees, as the oak, beech, apple, etc., hiding itself by day in the crevices of the bark, the moth appearing in the middle of April and October. It is mostly taken by digging for the pupæ at the roots of trees. It is a common and widely-dispersed species.

Note.—Boisduval forms this species alone into his genus Agriopis; its caterpillar state differing from that of the preceding species.

SPECIES 6—MISELIA TEMPLI. PLATE XXXIX., FIG. 11.

SYNONYMES.—*Noctua Templi*, Thunberg; Ochsenheimer; Stephens, Ill. Haust. 3, pl. 26, f. 1 (Polia T.); Wood, Ind. Ent., pl. 13, fig. 301. *Crymodes Templi*, Guénée; Doubleday.

This species measures 1¾ inch in the expanse of the fore wings, which are of a dark greenish ashy-brown, with yellowish stigmata and waved strigæ, which are, however, very indistinctly marked, the stigmata being small; the striga preceding the stigmata is very much angulated, and edged with black, and that following them is curved and much indented, and the subapical one is irregularly waved. The centre of the wing is darkest; the cilia is concolorous, with dark spots; the hind wings ashy-yellow, with a rather indistinct central lunule, and two dusky strigæ.

Very rare, but widely dispersed, having been taken in Devonshire, and near Liverpool and Birmingham. This species scarcely appears to possess a stronger relation with the typical Miseliæ than with the Poliæ, in which genus it is placed by Mr. Stephens.

DESCRIPTION OF PLATE XL.

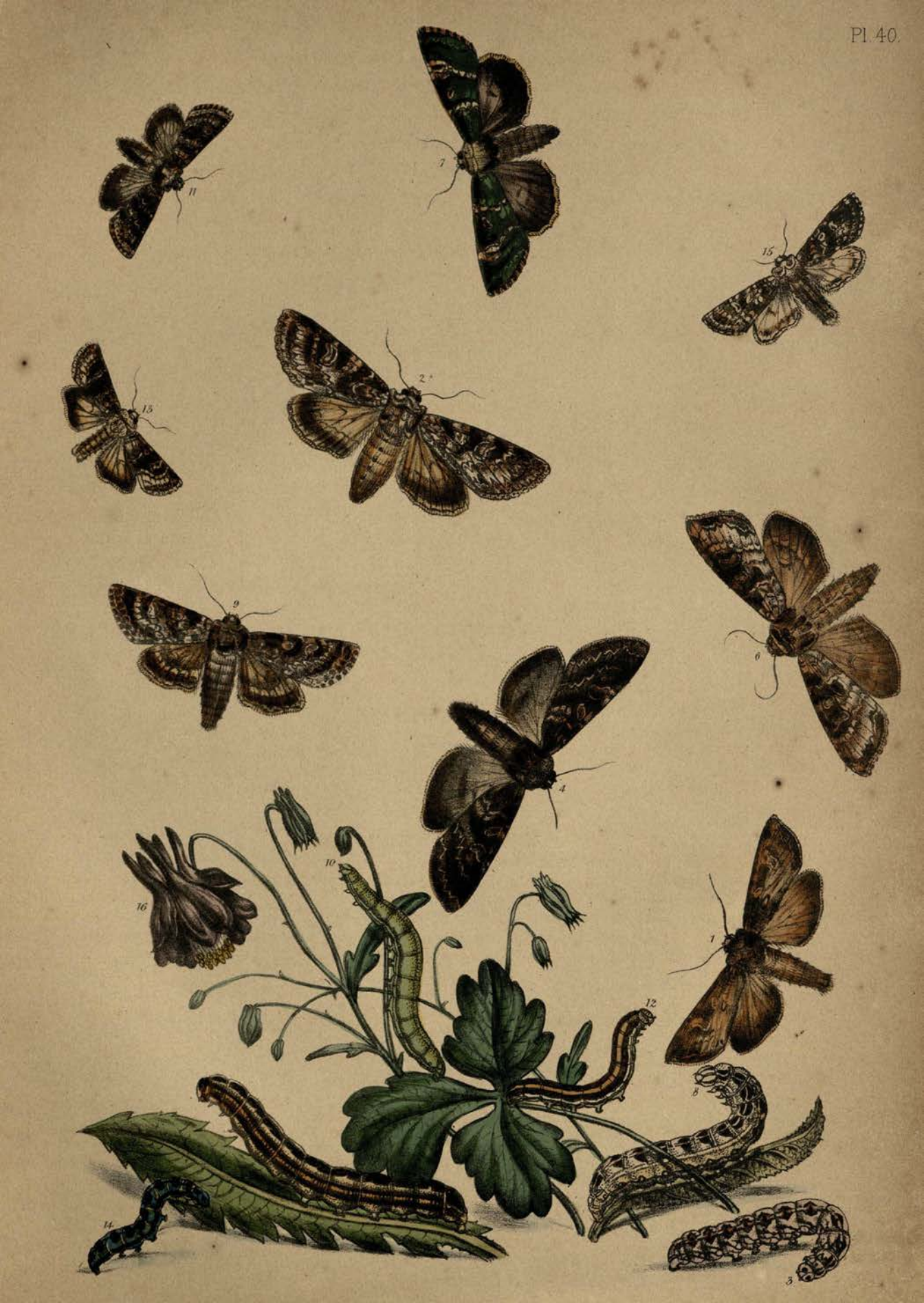
INSECTS.—Fig. 1. Polia advena (the pale shiny brown).
" Fig. 2. Polia nebulosa (the grey arches). 3. The Caterpillar.
" Fig. 4. Polia occulta (the great brocade). 5. The Caterpillar.
" Fig. 6. Polia Tincta (the silvery arches).
" Fig. 7. Polia Herbida (the green arches). 8. The Caterpillar.
" Fig. 9. Polia Flavocincta (the large Ranunculus). 10. The Caterpillar.
" Fig. 11. Polia Dysodea (the Ranunculus). 12. The Caterpillar.
" Fig. 13. Polia Serena (the broad-barred white). 14. The Caterpillar.
" Fig. 15. Polia Chi (the July Chi).

PLANT.—Fig. 16. Aquilegia vulgaris (common Columbine).

Figure 7, Polia Herbida, is from a beautiful drawing by J. Marshall, Esq., made while the fine insect taken by himself was still fresh, a great advantage, as the rich green tint very soon fades; so that the specimens generally seen in cabinets convey but a slight idea of the lively colouring of the living moth. Figs. 1, 2, 4, 13, and 15 are from specimens furnished me by Mr. H. Doubleday; 4, P. occulta, from one of three specimens captured by that gentleman this season at Epping. Figs. 6, 9, and 11 are from the cabinet of Mr. Bentley. All the caterpillars are from Hübner. Polia Polymita, which is in our lists as a British species, I have omitted altogether, as the only specimen upon which its insertion was founded (the one in the cabinet bequeathed by the late Mr. Vigors to the Zoological Society) has been lost. H. N. H.

POLIA, HÜBNER. (APLECTA, GUENÉE, BDV., NEC POLIA, BDV.)

The species of this group, as here associated together, according to the views of English authors, form an artificial assemblage, comprising, however, some of the largest insects of the present family, some of them being very closely allied to the Miselia, from which, however, they differ in their larvæ being without protuberances at the extremity of the body. The antennæ are slender, with the under side furnished, in the males, with a row of bristles, or with pectinated lobes; the palpi are elevated as high as the top of the eyes, and obliquely porrected;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the terminal joint distinct; the head scaly; the thorax with a slightly trilobed crest; the fore wings generally pale in their ground-colour, with dark markings; the caterpillars smooth, cylindrical, with longitudinal lines.

SPECIES 1.—POLIA ADVENA. PLATE XL., FIG. 1.

SYNONYMES.—*Noctua advena*, Wien. Verz.; Hübner; Treitschke; Haworth; Stephens; Wood, Ind. Ent, pl. 13, fig. 295.

This species measures from 1⅝ to 2 inches in the expanse of the fore wings, which are of an ashy-brown colour, with a silvery shining gloss, with three stigmata and three strigæ of a somewhat paler colour, but more or less obsolete; the first strigæ is before and the second beyond the middle of the wing, between which are the two ordinary and a club-shaped supplemental stigma, of which the margins alone are conspicuous; the third, or subapical striga, is formed of a series of angulated, fulvous, confluent spots, margined externally with paler colour; the apex itself with a very slender waved striga, formed of black curved lines; the costa is obsoletely spotted with whitish; the hind wings are pale brown, with a broad dusky border. Occasionally, as in our figure 1, the wings are almost entirely concolorous, with only a slight white edging to the stigmata, and a reddish patch behind the anterior, and another beyond the posterior stigmata. This is rather an uncommon species, frequenting gardens in June and at the beginning of July; the caterpillar feeding on lettuce and dandelion. Found in Norfolk, Suffolk, Surrey, Devonshire, Essex.

NOCTUA NITENS, Haworth (Stephens; Wood, Ind. Ent., pl. 13, fig. 296), has been regarded as a variety of the preceding species, than which, however, it is smaller, measuring 1⅛ inch in the expanse of the fore wings, which are of a redder-brown colour, with the extremity more silvery; the supplemental stigma larger, the apical striga more distinct, and formed of angulated, confluent spots; the antennæ are setaceous and naked, and not furnished with bristly pectinations.

SPECIES 2.—POLIA NEBULOSA. PLATE XL., FIG. 2, 3.

SYNONYMES.—*Polia nebulosa*, Ochsenheimer; Boisduval; Guénée; Doubleday.
Noctua plebeia, Hübner; Duponchel.
Noctua bimaculosa, Esper; Stephens; Wood, Ind. Ent., pl. 13, f. 297.
Noctua Thapsi, Borkhausen; Brahm.
Noctua grandis, Donovan, vol. 10, pl. 341, f. 1; Haworth.
Noctua polyodon, Illiger.

This fine species measures from 1⅝ to 2⅛ inches in the expanse of the fore wings, which are of a greyish-white colour with a silvery gloss, varied with blackish markings and streaks. The two strigæ at the base of the wing are more or less distinct, and edged with black angulated lines on each side; the anterior stigma is round, and the outer one broadly ear-shaped; behind the anterior one is a darker supplemental stigma, partially edged with a black hook-like mark; the third striga is indicated by a series of black dots on the veins, the subapical striga being more distinct, and formed of a row of black angulated marks more or less confluent and differing in size, the largest being towards the anal angle; along the apex, as well as on the costa, is a row of black dots; the hind wings are obscure greyish-brown, with a darker border: the female is darker than the male.

This is a widely-dispersed and common species, found in June on the trunks of trees. The caterpillar, as represented by Hübner, is of a greyish-buff colour, with the back more fulvous, having a central longitudinal white line interrupted by black dots, and with brown angulated patches on each side; the sides of the body with oblique dark lines. It feeds on Verbascum Thapsus.

SPECIES 3.—POLIA TINCTA. PLATE XL., FIG. 6.

SYNONYMES.—*Noctua tincta*, Brahm.; Treitschke; Stephens; Wood, Ind. Ent., pl. 13, fig. 298.
Noctua trimaculosa, Esper.
Noctua advena, Vieweg.
Noctua hepatica, Hübner.
Noctua argentina, Haworth.

This species is very closely allied to the preceding, the expansion of the fore wings measuring from 1⅝ to

two inches, and being of a pale reddish-brown colour, with the hind and apical margins silvery ash, with the markings distinct, but not so strong and dark as in P. nebulosa; the supplemental stigma is dark, and partially edged with a black hook; the space between the two ordinary stigmata is narrow, with black edgings; and the subapical striga is marked by three black spots near the costa, in the middle and at the anal angle; the margin itself, as well as the costa, is spotted with black. The hind wings are brown, with a central lunule, and the margin dusky; the thorax is ashy, with a reddish crest. The eyes in this species are naked, whereas in the allied species they are pubescent.

The caterpillar is grey, with black dorsal and ochreous lateral stripes and a waved reddish line above the spiracles. It feeds on Ononis spinosa, and the moth is produced at the end of June and beginning of July. Taken occasionally in the woods of the London district.

SPECIES 4.—POLIA OCCULTA. Plate XL., Fig. 4, 5.

Synonyme.—*Phal. Noct. occulta*, Linnæus; Hübner; Haworth; Curtis, Brit. Ent., pl. 248; Stephens; Wood, Ind. Ent., pl. 13, fig. 303.

This species measures nearly 2¼ inches in the expanse of the fore wings, which are dusky grey, spotted and freckled with brown; at the base of the wings is a longitudinal black line, running through the two ordinary waved basal strigæ, which are pale-coloured; the anterior stigma is oval and oblique, and the second large and ear-shaped, with the margin pale and whitish; behind the former is an oblong oval supplemental stigma, edged with black; beyond the stigma the wings are much mottled in appearance, the third striga being distinct and curved, edged with a wavy whitish line; the fourth or subapical striga is pale, slender, and very irregular, with several black conical dashes resting on it within; the costa and apical margin are spotted with black; the hind wings brown, dark along the margin, and with a dusky central lunule.

The caterpillar is black on the back; the sides brown, with ochreous longitudinal lines: it feeds on lettuce and dandelion, and is full-grown in May. The moth appears in July, but is rare, although found in various places, as Epping Forest, near Dover, in Cheshire, etc.

SPECIES 5.—POLIA HERBIDA. Plate XL., Fig. 7, 8.

Synonymes.—*Noctua Herbida*, Wien. Verz.; Hübner; Treitschke; Godart; Stephens, Ill. H. 3, pl. 27, f. 3; Wood, Ind. Ent., 13, fig. 299.
Noctua mixta, Haworth.
Noctua prasina, Fabr.
Noctua egregia, Esper.
Noctua jaspidea, Borkhausen; Esper.

This fine species measures from 1⅝ to 2 inches in the expanse of the fore wings, which are varied with green and brown; the green, however, greatly predominating in fresh specimens, as may be perceived by a comparison in our figure with that of Mr. Stephens; the base of the wing is considerably mottled with whitish; the second ordinary striga preceding the stigmata being very distinct, and formed of a nearly transverse series of white arches edged with black; the stigmata are rather large, with the centre reddish-brown, edged with white and encircled with black lines; the supplemental stigma is also distinct: immediately succeeding the ear-shaped stigma is a pale patch, through which runs the third striga, which is black and much waved, edged on both sides with pale, and the fourth striga is very much dentated; the apical margin with a series of conical black dots; the hind wings dark brown with the base rather paler.

The caterpillar is grey on the back, with two black patches on each segment; the head and sides of the body brown, with dark longitudinal lines, above which is a white line; the spiracles are also white: it feeds on Cochlearia armoracia. The perfect insect appears in June, but is rare, although widely dispersed, having been taken at Darenth Wood, Kent; Lanark, in Scotland, and in Norfolk.

SPECIES 6.—POLIA POLYMITA?

SYNONYMES.—*Ph. Noct. Polymita*, Linnæus? Ochsenheimer; Treitschke; Stephens, Ill. H. 3, pl. 26, fig. 2; Wood, Ind. Ent., pl. 13, f. 300. *Noctua rideus* (*Polymita*), Hübner.

As the unique* British specimen of this supposed species (which was described and figured by Mr. Stephens from the Vigorsian Cabinet, now belonging to the Zoological Society) is, as I am informed, no longer contained in that collection, I am under the necessity of giving the following abstract from Mr. Stephens's description, who, however, doubts its identity with the Linnæan Polymita, although it seems to agree with his concise definition of that insect, though not exactly with the figure in Engramelle, referred to by Treitschke. The expansion of the fore wings is $1\frac{3}{4}$ inch, with the base and apex cinerescent, the centre greenish-brown, forming a fascia of that colour bearing the stigmata, and bounded anteriorly by an oblique crenated white striga, margined externally with black, and exteriorly by a strongly dentate or angulated one, edged anteriorly with black; towards the hinder (apical) margin is a waved fuscous cloud and an apical crenated black line; the posterior stigma is large and rather irregular, and clouded with ashy; hind wings dusky, with an obsolete crenated dark striga beyond the middle.

SPECIES 7. POLIA FLAVOCINCTA. PLATE XL., FIG. 9, 10.

SYNONYMES.—*Noctua flavocincta*, Wien. Verz.; Fabr.; Ochsenheimer; Treitschke; Donovan, vol. 10, pl. 334; Haworth; Wilkes, 7, pl. 14, fig. sup.; Stephens; Wood, Ind, Ent., pl. 13, fig. 302.

Phal. Noctua tricolor, Villers.
Noctua dysodea, Borkhausen.
Noctua flavocincta major, Esper.

This species measures about $1\frac{3}{4}$ inch in the expanse of the fore wings, which are of an obscure whitish colour, slightly mottled with brown, and with the characteristic marks edged with fulvous; those towards the base of the wing are very obscurely indicated; the anterior stigma is rather square, and edged before and behind with fulvous, and behind it is all that exists of the second ordinary striga, which is slender, black, much dentated; the second stigma is large, and also similarly edged with fulvous; the space between and behind them being dusky. The third ordinary striga consists of a very much curved and dentated dusky line, or rather a succession of arches, and the fourth striga consists of a series of indistinct dusky blotches edged with fulvous towards the apical margin. The hind wings have a slight dusky crenated striga beyond the middle, and an ashy border. The caterpillar is green, with a yellow stripe down the back, and a pale longitudinal line above the feet. It feeds on lettuce, dock, currant, etc. The perfect insect appears in August and September, and is a rather common species. Boisduval introduces this into his genus Polia, as distinct from his Aplectæ (nebulosa, tincta, etc.) Our figures of the caterpillars show a sufficient discrepancy to warrant at least the formation of distinct sections in the genus for their reception.

SPECIES 8.—POLIA DYSODEA. PLATE XL., FIG. 11, 12.

SYNONYMES.—*Noctua dysodea*, Wien. Verz.; Hübner; Treitschke; Stephens; Wood, Ind. Ent., pl. 14, fig. 305; Wilkes. 7, pl. 14, fig. inf.
Noctua ranunculina, Haworth.

Noctua chrysozona, Borkhausen.
Noctua flavocincta minor, Esper.
Noctua spinaciæ, Vieweg.
Ph. Noctua ornata, Villers.

The expansion of the fore wings is about $1\frac{1}{5}$ inch; they are of an ashy-white colour, the central characteristic part of the wing being much darker, and considerably more angulated in its outline than in P. flavocincta; the basal striga, is, however, whitish, and preceded by a black and fulvous stripe; the second striga is extended to the costa, and much sinuated, especially behind; the stigmata are rather indistinct, but bordered before and behind with dusky and fulvous stripes, which extend to the costa; the third striga consists of a very much

* Mr. Wood mentions the species as existing in the collections of Mr. Stephens and Mr. Vigors.

angulated series of slender black arches, and the apical portion of the wing is mottled with whitish and pale brown, with a slightly distinct fulvous subapical striga; the hind wings are ashy, with a brown margin.

Mr. Haworth suggests that this and the allied species have derived their common name of Ranunculus moths from a fancied resemblance in some of their markings to the double Ranunculus flower, especially the radiated mark near the posterior stigma. The caterpillar is dark green, or greenish-brown, with a pale longitudinal line above the feet. It feeds on lettuce, wormwood, etc. The moth, which is rather abundant, appears in July.

SPECIES 9.—POLIA SERENA. PLATE XL., Fig. 13, 14.

SYNONYMES.—*Noctua serena*, Wien. Verz.; Fabricius; Hübner; Haworth; Treitschke; Stephens; Wood, Ind. Ent., pl. 14, fig. 306. *Noctua bicolor*, Naturforscher, 9, 137. *Noctua bicolorata*, Hufnagle. *Ph. Noct. Par.*, Donovan, vol. 10, pl. 338, f. 3; Harris Exp., pl. 4, f. 8.

This beautiful but common insect measures about 1¼ inch in the expanse of the fore wings, which are white, with the central characteristic part rich brown or ochraceous, or deep brown varied with black marks; the basal striga is interrupted, consisting of an angulated black line, preceded by a brownish patch at the base; the second striga is slightly waved and white, bordered before with a dusky line, and behind by the black edge of the central dark bar. The stigmata are brown, with the margin white; the third striga resembles the second, but is much curved, and formed of a series of white arches edged as in the second striga. Towards the apex on the costa (which is throughout varied with dark spots) is a triangular dusky patch; the apical portion of the wing is almost white, or occasionally more mottled, the striga being only very slightly indicated; there are, however, two more conspicuous dusky spots above the middle towards the margin. The apex is formed by a pale brown sinuated line, and the cilia is spotted with white and brown; the hind wings are brown, with the base pale.

The caterpillar is dark green, with dark patches on the back, and a pale line above the feet. It feeds on Leontodon hispidum, Sonchus palustris, etc.; and the moth, which is an abundant species, is found in June, on shady palings and trunks of trees.

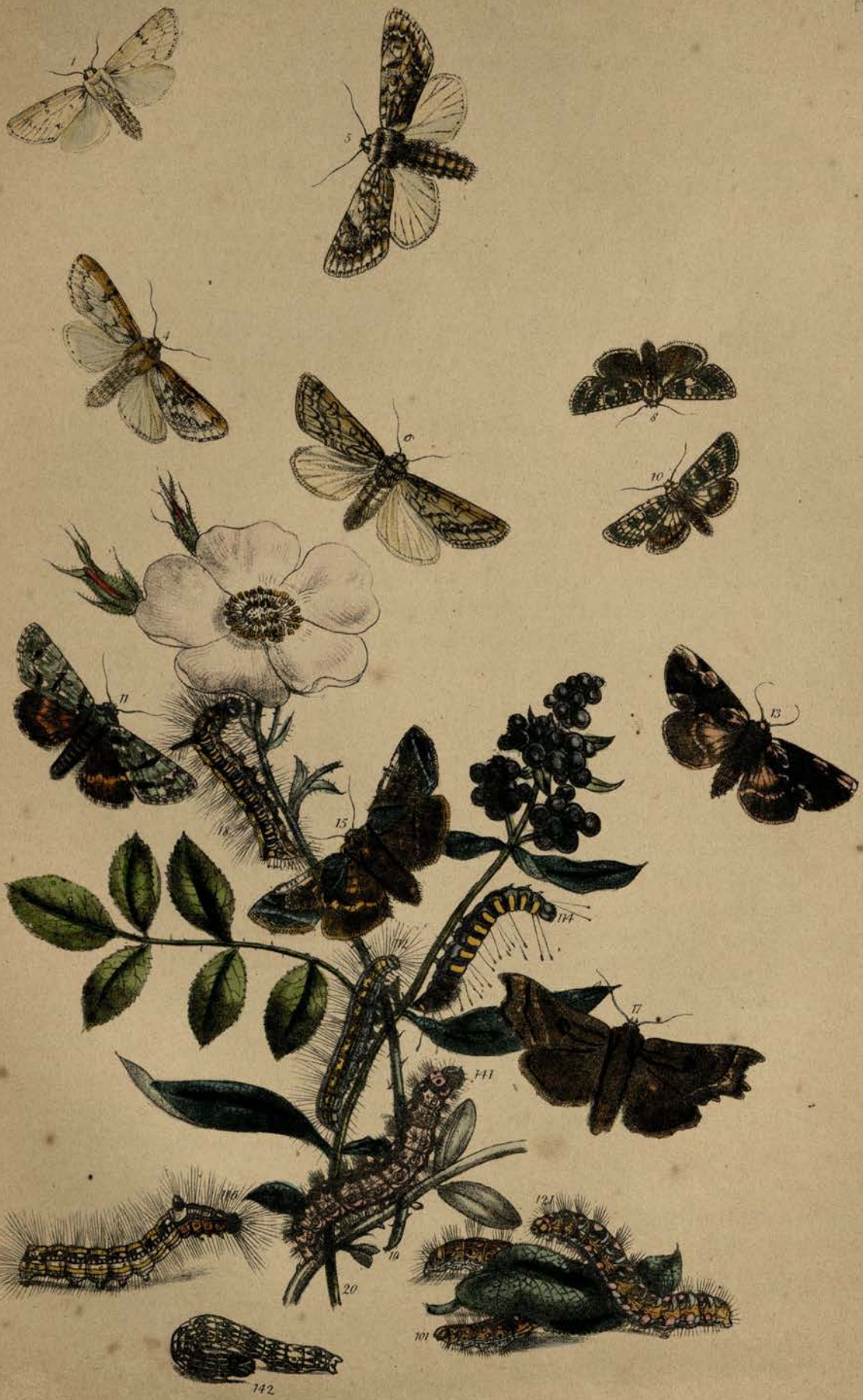
SPECIES 10.—POLIA CHI. PLATE XL., Fig. 15.

SYNONYMES.—*Ph. Noctua Chi*, Linnæus; Hübner; Haworth; Donovan, vol. 12, pl. 406; Albin, pl. 83, fig. C, D,; Stephens; Wood, Ind. Ent., pl. 14, fig. 308. *Polia olivacea*, Stephens (variety).

This species measures nearly 1½ inch in the expanse of the fore wings, which are of a whitish-grey colour clouded with ashy or fulvous brown, and marked towards the middle with a black Greek χ. The basal strigæ are almost lost in the clouding of this part of the wing; the ordinary stigmata are pale, the centre being only slightly rufescent; the space between and behind them is somewhat darker than the rest of the wing, and it is on this part that the Greek character is found, connecting in fact the second and third strigæ, which latter consists of a curved series of white arches, edged with slender brown lines; the apical striga is almost indistinct, being chiefly indicated by the black or blackish dashes which rest upon it within. The hind wings are nearly white, with a central dusky lunule, and a subapical irregular dusky striga.

Polia olivacea, described by Mr. Stephens, in the Appendix to the third volume of his Illustrations, as measuring 1⅓ inch in the expanse of the fore wings, and of a green olive colour, with four denticulated white strigæ and black markings; the stigmata faintly bordered with black and white, and the ciliæ ashy-white, with olivaceous spots, and taken at Cramond, near Edinburgh, by Mr. Little; has subsequently been considered as a variety of P. Chi. (Ill. H. 4, p 389.)

The caterpillar is green, with two white lines on the sides; it feeds on Lactuca sativa, Sonchus oleraceus, Aquilegia vulgaris, Arctium lappa, etc.; and the moth appears in July. It appears to be an abundant species in the northern counties of England.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DESCRIPTION OF PLATE XLI.

INSECTS.—Fig. 1. Apatela Leporina (the miller). Fig. 12 in Plate 42. The Caterpillar. 13 in Plate 42. The Caterpillar when young.
" Fig. 4. Apatela Bradyporina (the ashy miller).
" Fig. 5. Apatela aceris (the sycamore). 6. A dark variety. Fig. 17 in Plate 42. The Caterpillar.
" Fig. 8. Bryophila glandifera (the marbled green). Fig. 19 in Plate 42. The Caterpillar.
" Fig. 10. Bryophila Perla (the marbled beauty).
" Fig. 11. Diphthera Orion (the scarce marvel du jour). Fig. 112 in Plate 42. The Caterpillar.
" Fig. 13. Thyatira Batis (the peach blossom). Fig. 114 in Plate 42. The Caterpillar.
" Fig. 15. Thyatira Derasa (the buff arches). Fig. 116 in Plate 42. The Caterpillar.
" Fig. 17. Scoliopteryx libatrix (the herald). Fig. 118 in Plate 42. The Caterpillar.

PLANTS.—Fig. 19. Rosa canina (the common Dog-rose).
" Fig. 20. Ligustrum vulgare (the common Privet).

The whole of the above insects are from the cabinet of Mr. Bentley; and the caterpillars are from Hübner and Duponchel.

Figs. 18, 112, 114, 116, 101, 121, 141, 142, are caterpillars, referring to Plate 42, and named in the description of that Plate. H. N. H.

APATELA, HÜBNER. (ACRONYCTA, P., OCHSENHEIMER.)

The antennæ in this genus as restricted by Mr. Stephens, are simple in both sexes; the palpi short, slightly porrected, with the terminal joint slightly exposed; the head with a dense tuft on the forehead; the thorax not crested; the fore wings rather elongated, with the apical margin entire; the stigmata indistinct. The larvæ are so densely hairy as to conceal the form of the body; and whilst young they have several tufts along the back, as in the larvæ of some of the Arctiidæ, which they greatly resemble. Boisduval and Curtis unite the species with the Acronyctæ, whilst Guénée confines the generic name Apatela to Leporina and Bradyporina.

SPECIES 1.—APATELA LEPORINA. PLATE XLI., FIG. 1, AND PLATE XLII., FIG. 13.

SYNONYMES.—*Phal. Noct. leporina*, Linnæus; Hübner; Haworth; Donovan, 10, pl. 327, fig. 1; Stephens; Wood, Ind. Ent., pl. 14, fig. 309.
Noctua Bradyporina, Hübner.

This species measures from 1 1/2 to 1 3/4 inch in the expanse of the fore wings, which, as well as the hind ones, are white, the former with a few small black dots on the surface of the wings; and one curved and larger, of the same colour, placed at the extremity of the discoidal cell. The ciliæ are also spotted with black; all the spottings are more distinct in some specimens than in others. The caterpillar is densely clothed with yellow hairs, and has several gold-coloured tufts along the back. It feeds on the alder, willow, elm, birch, etc.; and the moth appears in May and August. It is a rare species, but is taken occasionally in the woods round London.

SPECIES 2.—APATELA BRADYPORINA. PLATE XLI., FIG. 4, AND PLATE XLII., FIG. 12.

SYNONYMES.—*Acronycta Bradyporina*, Treitschke; Steph., Ill., 3, pl. 26, fig. 3; Wood, Ind. Ent., pl. 14, fig. 310.
Bombyx leporina, Fuessly; Hübner.

This species is now considered by the continental entomologists as a variety of the preceding, from which it differs, however, in the wings being much more irrorated with blackish scales than in that insect, with a slender line of fulvous and black running from the base towards the middle of the wing, as well as in having a much more conspicuous curved row of dusky arches extending across the wing obliquely between the place of the outer stigma and the apical margin of the wings; the hind wings are white, with the cilia maculated with black. The caterpillar is grass-green, with a dark dorsal line, and densely clothed with white hairs. It feeds on the Prunus domestica; and the moth appears in the beginning of June, and is much rarer than the preceding.

SPECIES 3.—APATELA ACERIS. PLATE XLI., FIG. 5, 6, AND PLATE XLII., FIG. 17.

SYNONYMES.—*Phalæna (Noctua) aceris*, Linn.; Hübner; Haworth; Donovan, 10, pl. 330; Albin, pl. 83, fig. a—d; Wilkes, pl. 67; Stephens; Wood, Ind. Ent., pl. 14, fig. 311. *Noctua infuscata*, Haworth (variety).

This species measures from 1½ to 1⅔ inch in the expanse of the fore wings, which are of a slaty-grey colour finely mixed with scales, and with undulating blackish lines, and a small black ring in the place of the anterior stigma; the basal striga is obliterated, but the base of the wing is marked with a trifid black mark. The second striga is more distinct and dentate, being margined with dusky lines on each side; the outer stigma is much more obscure than the other, and is succeeded by a strongly-curved series of pale arches edged on each side with dusky lines, the apical portion of the wing being pale, with the veins rather darker; the cilia is spotted at the base with blackish. Varieties occur with the ground-colour of the fore wings dark brown, but marked as in the type of the species. Such specimens Mr. Haworth considered as a distinct species, but Mr. Stephens has reared them and the type from the same batch of eggs. The caterpillar is thickly clothed with yellow hairs, with golden brown tufts, as well as a series of pale chain-like marks, edged with black down the back. It feeds on the horse-chestnut, sycamore, maple, etc. The perfect insect appears at the end of June, and is of common occurrence.

DESCRIPTION OF PLATE XLII.

INSECTS.—Fig. 1. Acronycta ligustri (the coronet). Fig. 112 in Plate 41. The Caterpillar.
" Fig. 3. Acronycta alni (the alder-moth). Fig. 114 in Plate 41. The Caterpillar.
" Fig. 5. Acronycta Psi (the dagger-moth). Fig. 116 in Plate 41. The Caterpillar.
" Fig. 7. Acronycta tridens (the dark dagger). Fig. 18 in Plate 41. The Caterpillar.
" Fig. 9. Acronycta auricoma (the scarce dagger). Fig. 101 in Plate 41. The Caterpillar.
" Fig. 11. Acronycta menyanthedis (the light knot-grass).
" Fig. 13. Acronycta euphorbiæ (the spurge moth). Fig. 141 in Plate 41. The Caterpillar.
" Fig. 15. Acronycta rumicis (the bramble moth). Fig. 121 in Plate 41. The Caterpillar.
" Fig. 16. Acronycta megacephala (the poplar grey). Fig. 142 in Plate 41. The Caterpillar.

PLANTS.—Fig. 50. Menyanthes trifoliata (the Buck-bean).
" Fig. 60. Rubus cæsius (the Dewberry).

All the moths in this Plate are from the cabinet of Mr. Bentley; the caterpillars are from Hübner.
Figs. 12, 13, 17, 19, 112, 114, 116, are caterpillars, referring to Plate 41, and named in the description of that Plate. H. N. H.

ACRONYCTA, OCHSENHEIMER.

This genus, in the restricted state in which it is here (after Stephens) considered, is distinguished by the long setaceous and simple antennæ; the palpi are moderately long and slender, elevated as high as the top of the eyes, and porrected obliquely, with the terminal joint not concealed by the scales of the preceding joint. The head with a slight frontal crest; the thorax not distinctly tufted; the fore wings moderately elongated, and generally with dark, dagger-like markings, and the larvæ variegated in their colours, and clothed with long and occasionally clavate hairs; some of the species having moreover a strong protuberance on the back of the fourth segment of the body. The latter species are separated into a distinct genus by Guénée, under the name of Semaphora.

SPECIES 1.—ACRONYCTA LIGUSTRI. PLATE XLII., FIG. 1, AND PLATE XLI., FIG. 112.

SYNONYMES.—*Noctua Ligustri*, Wien. Verz.; Fabricius; Hübner; Haworth; Treitschke; Stephens; Wood, Ind. Ent., pl. 14, fig. 313. *Noctua coronula*, Haworth (variety).

This species measures about 1½ inch in the expansion of the fore wings, which are of a brown colour, with a

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ring and a coronet-like mark towards the extremity of the wing of a pale whitish colour; towards the base of the wing is a transverse-geminated black striga, a second, similar but much more undulating, precedes the anterior stigma, which is round and brown, with a white margin (forming the ring above mentioned), which colour is also extended to the costa; the supplemental stigma is also distinct and pale-coloured, and beyond the second stigma is the larger pale coronet-like marking, through which runs the third dentated striga; the apical margin is ashy or whitish spotted with brown, indistinctly representing the subapical striga; the cilia with a row of brown spots, the hind wings brown. The variety, named coronula by Haworth, differs in having the characteristic markings of a brownish colour.

The caterpillar is cylindrical and pale yellowish-green, with three pale yellow longitudinal stripes, and is clothed with long slender black hairs. It feeds on the privet, and the moth appears in May and June. It is occasionally taken in the woods in various parts of the south of England.

SPECIES 2.—ACRONYCTA ALNI. Plate XLII., Fig. 3, and Plate XLI., Fig. 114.

Synonymes.—*Phalæna (Noctua) alni*, Linnæus; Hübner; Donovan, 10, pl. 327, fig. 2; Haworth; Treitschke; Stephens; Wood, Ind. Ent., pl. 14, fig. 314.

This species measures about $1\frac{1}{2}$ inch in the expansion of the fore wings, which are of an ashy-grey colour, the inner margin being broadly suffused with black; at the base of the wing is a broad dark black streak, another similar one being near the anal angle, the angle itself being pale ashy; the striga preceding the stigmata is pale and margined with dusky on each side, but is obliterated towards the inner margin of the wing; the stigmata are almost obsolete, and the two apical strigæ are of a pale colour, nearly white. There is also a small patch of the same colour in the middle of the inner margin of the wing; the hind wings are whitish-buff, with a pale brown border.

The caterpillar is black, with orange-coloured dorsal patches and clavate hairs. It feeds on various trees, preferring the alder, and the moth appears in May and June. It is a rare species, although found in many parts of the country.

SPECIES 3.—ACRONYCTA STRIGOSA.

Synonymes.—*Noctua strigosa*, Wien. Verz.; Fabricius; Treitschke; Hübner; Duponchel; Stephens; Wood, Ind. Ent., pl. 52, fig. 1667. *Noctua favillacea*, Hübner; Esper.

A specimen of this insect was in the collection of the late Mr. Haworth, whence it was described by Mr. Stephens, and figured by Mr. Wood, as being about $1\frac{1}{4}$ inch ($1\frac{3}{4}$ inch, Wood) in the expanse of the fore wings, which are "whitish-grey mixed with dusky brown, with a pale striga before the middle, and an arcuated one behind, and pale stigmata, the interior one of which is bordered with black, and the latter partially so; the inner edge of the wing is fuscescent, with three longitudinal black streaks; on the hinder margin is a slender black line; the cilia white interrupted with dusky; posterior wings greyish-ash, with a transverse striga beyond the middle, and a narrow marginal line.* Caterpillar yellowish-green, with an irregular broad yellowish-brown dorsal line, sprinkled with black; head reddish. It feeds on the blackthorn and mountain-ash." Supposed to have been taken in Norfolk.

SPECIES 4.—ACRONYCTA MEGACEPHALA. Plate XLII., Fig. 16, and Plate XLI., Fig. 142.

Synonyme.—*Noctua megacephala*, Wien. Verz.; Fabricius; Hübner; Haworth; Stephens; Wood, Ind. Ent., pl. 14, fig. 312.

This species measures $1\frac{3}{4}$ inch in the expanse of the fore wings, which are grey, thickly irrorated and clouded

* Mr. Wood's figure represents the apical portion of the wing behind the stigmata as pale, slightly varied with pale brown, and with several conical black dashes.

with black scales, amongst which may be traced the two ordinary basal duplicated strigæ; the anterior stigma is pale, with a black ring and a dusky centre; the outer stigma is much curved, and is followed by a large pale patch, through which runs the much curved and arched third striga, the black outer edging of which forms a series of very strongly-marked black arches; the subapical curved striga is pale, but almost indistinct; the cilia is pale grey, spotted with black; the hind wings are white, with dusky veins, and a slender interrupted marginal fimbria. There is considerable diversity in the clearness of the characteristic markings, some specimens being almost suffused, with the markings nearly obliterated, whilst others have them pale and much more distinct.

The caterpillar is described by Fabricius as hairy,* brown, spotted with red, with the head broader than the body, and with a sulphur-coloured spot on the body behind. It feeds on poplars and willows; and the perfect insect, which is a common species, is found in May, and also in July and August.

SPECIES 5.—ACRONYCTA AURICOMA. PLATE XLII., FIG. 9, AND PLATE XLI., FIG. 101.

SYNONYME.—*Noctua auricoma*, Wien. Verz.; Fabricius; Hübner; Haworth; Treitschke; Stephens; Wood, Ind. Ent., pl. 14, fig. 317; Duponchel; Esper.

This species measures about $1\frac{1}{2}$ inch in the expansion of the fore wings, which are varied with ashy-brown and grey colours, with the two ordinary dentate geminated basal strigæ of black colour; the anterior stigma is subocellated, with a black ring and a brown pupil. The outer stigma is kidney-shaped and bordered with black and white, with a black dentated line at the base. The third striga is very much dentated and black, and terminates towards the anal angle in a black mark like the Greek letter Psi; the apex is more or less varied, with a pale subapical striga; and the costa, as well as the cilia, is varied with black dots. The hind wings are brown, with the base ashy-coloured in the males. Like the preceding species, the present varies very considerably in the strength of the characteristic markings of the fore wings. The caterpillar is brown or black, with a reddish spot on each segment, and the sides above the feet grey; it is clothed with fulvous hairs, and feeds on the beech, bramble, dewberry, etc., and the imago appears in May and July. It is a comparatively rare species in the woods round London.

NOCTUA SIMILIS, of Haworth, the scarce knot-grass (Stephens; Wood, Ind. Ent.), is regarded as a probable variety of Auricoma, measuring $1\frac{5}{12}$ inch in expanse, with the wings more ashy, with a slightly waved striga before the middle; another oblique brown abbreviated one in the middle, and a third, submoniliform and hoary, placed on the apical portion of the wing; the hind wings whitish, with a rather dusky fimbria.

NOCTUA MENYANTHEDIS, the light knot-grass of Haworth, (but not of Hübner), is also a variety measuring $1\frac{1}{2}$ inch in expanse, and of a hoary ashy colour, with the stigmata distinct, and a brown duplicated striga before, and another narrower and dentate one behind the middle, the latter terminating in a Psi-like mark.

SPECIES 6.—ACRONYCTA MENYANTHEDIS. PLATE XLII., FIG. 11.

SYNONYMES.—*Noctua Menyanthedis*, Hübner; Esper; Treitschke; Stephens, Ill. Haust. 3, pl. 27, fig. 1; Wood, Ind. Ent., pl. 14, fig. 318. *Acronycta Salicis*, Curtis, Brit. Ent., pl. 136 (variety).

This species measures about $1\frac{1}{2}$ inch in the expanse of the fore wings, which are of a pale slaty-grey colour, with the inner margin darker coloured, and a dark dentated striga towards the apex of the wings. The base of the wing is slightly clouded, and bears a strongly-marked black hook; the striga preceding the stigmata is somewhat more distinct, geminated; the anterior stigma is very small, and formed of a black ring; the outer one is larger,

* In the specimen represented in our plate, the hairs had probably been abraded, or the insect might have been in the act of forming its cocoon, when the hairs are shed.

with the margins dark; the third striga is white, bordered by the strongly-dentated dark bar which extends, of a less intense colour, to the apex of the wing, the subapical striga being almost obsolete; the cilia is spotted with dusky shade; the hind wings are pale, with the veins suffused with dusky shade, forming an interrupted margin. Varieties occur in which the ordinary strigæ are much more distinct and brown, forming broad patches on the wing; the subapical striga very irregularly waved, and succeeded by a dusky cloud reaching to the tip of the wing; the inner margin at the base of the third striga being marked with a more distinct pale lunular patch. Such a variety constitutes the A. Salicis of Curtis.

The caterpillar is black, with fulvous hairs, and a stripe of red on each side above the feet; it feeds on Menyanthes triplicata, as well as Myrica gale, and sallow. The moth appears in June, and seems in its range to be a northern species.

SPECIES 7.—ACRONYCTA RUMICIS. Plate XLII., Fig. 15, and Plate XLI. Fig. 121.

Synonyme.—*Phalæna Noctua Rumicis*, Linnæus; Hübner; Donovan 4, pl. 126; Haworth; Albin, pl. 22, fig. 32, e—i; Wilkes, pl. 56; Stephens; Wood, Ind. Ent., pl. 14, fig. 319

This common insect measures about 1½ inch in the expanse of the fore wings, which are of a fulvous grey colour, varied with brown patches and blackish markings; the two basal strigæ are broad and brown, with strongly-dentated black edges on both sides; the anterior stigma is round, with the centre slightly dusky, and a black circle; it rests upon a large pale yellow patch, terminated behind by a black spot, connecting the two strigæ; the outer stigma is large and nearly semicircular, brown in the middle, and with an edging of black and brown, followed by a paler patch, which is terminated by the very strongly dentate duplicated third striga, the innermost angle of which is almost white within, beyond this striga; the wing is prettily mottled, the subapical striga being pale but not distinct; there is also a row of marginal black dots; the hind wings are fulvous brown, with a broad dusky border and a central spot.

The caterpillar is hairy and brown, spotted on the sides with red and white, with dorsal black and red patches. It feeds on the dock, bramble, poplar, etc., in the autumn; and the moth appears in May. It is a very abundant species.

SPECIES 8.—ACRONYCTA EUPHORBIÆ. Plate XLII., Fig. 13, and Plate XLI., Fig. 141.

Synonyme.—*Noctua Euphorbiæ*, Wien. Verz.; Fabricius; Hübner; Haworth; Stephens; Treitschke; Wood, Ind. Ent., pl. 14, fig. 320.

This species is closely allied to A. Rumicis, measuring 1½ inch in the expanse of the fore wings, which are ashy-brown-coloured, with brown blotches; the stigmata whitish-coloured, preceded by the two ordinary strigæ; the space between the stigmata is pale; the anterior stigma is round, and the outer one kidney-shaped, both having a brown margin; the third striga is terminated on the inner margin by a pale mark, and the subapical striga is pale, the apex of the wing being dark; the cilia is pale, spotted with brown; the hind wings and abdomen ashy-coloured.

The caterpillar is pale-coloured and hairy, with black dorsal spots and red lunules on each side above the feet, except in the pedigerous segments, each of which has a white lunule. It feeds on several species of Euphorbia, and the moth appears in May and August. It is a rare species, having occurred near London and in the New Forest.

SPECIES 9.—ACRONYCTA EUPHRASIÆ.

Synonymes.—*Noctua Euphrasiæ*, Treitschke; Borkhausen; Duponchel; Stephens; Wood, Ind. Ent., pl. 14, fig. 321; Albin, pl. 88, fig. f. | *Noctua Euphorbiæ*, Esper. *Noctua Esulæ*, Hübner.

This species measures 1½ inch in the expanse of the fore wings, which are of an ashy-yellow tinge with brown

waves, and various black undulated strigæ; the anterior stigma is obsolete, and the posterior one obscure and ashy-coloured, and a brown margin; the third striga terminates on the inner margin by a pale patch. The subapical striga pale and waved, the apex spotted with brown; the hind wings pale whitish-ash, with a spot in the centre, and the border brownish; the abdomen ashy-yellow. The caterpillar is black, with a row of white patches on the back, and another of red spots above the feet on each side: it feeds on Euphrasia officinalis, various species of Euphorbia, etc., and the imago appears in May and August. Mr. Stephens possesses a specimen captured near London.

Note.—The two remaining species are called Dagger Moths, by collectors, from their peculiar markings. Their larvæ also are remarkable, from the protuberance on the back of the fourth segment, whence they have been generically separated by M. Guénée, under the name of Semaphora.

SPECIES 10.—ACRONYCTA PSI. PLATE XLII., FIG. 5, AND PLATE XLI., FIG. 116.

SYNONYMES.—*Phalæna Noctua Psi*, Linnæus Fabricius; Donovan, 4, pl. 133; Albin, pl. 86, fig. f; Wilkes, pl. 60; Harris, Aurelian, pl. 15; Haworth; Stephens; Wood, Ind. Ent., pl. 14, fig. 315. *Noctua tridens*, Hübner.

This species measures 1½ inch in the expanse of the fore wings, which are of an ashy-brown colour, the costa with several short oblique blackish strigæ; from the base of the wing runs a black stripe, which is forked at its apex; there is another mark on the space intervening between the stigmata, resembling the letter X; the ordinary strigæ are more or less obliterated, except the third, which is indicated by a slender irregularly-dentated line, which is crossed towards the apex and the anal angle by two black streaks, each of which forms a mark like the Greek letter ψ. The anterior stigma is very faintly indicated by a slender, black, circular line; and the outer one is nearly obsolete. The cilia is irregularly spotted with brown; the hind wings brownish, with the nervures and margin darker.

The caterpillar is hairy and black, with a yellow line down the back, and several red transverse stripes on the sides of each segment, and a white line above the feet; the fourth segment of the body with an erect, elongated, black, conical protuberance. It feeds on various trees, as the lime, poplar, beech, etc.; and the moth appears in June and July, and is one of our most abundant species.

SPECIES 11.—ACRONYCTA TRIDENS. PLATE XLII., FIG. 7, AND PLATE XLI., FIG. 18.

SYNONYMES.—*Noctua tridens*, Wien. Verz.; Fabricius; Ochsen.; Haworth; Albin, pl. 86, fig. f; Stephens; Wood, Ind. Ent., pl. 14, fig. 316. *Noctua Psi*, Hübner.

This species is very closely allied to the preceding, but is generally somewhat larger, measuring from 1½ to 1⅔ inch in the expanse of the fore wings, which are of a pale ashy-grey, with black Psi-like markings; a black bar runs longitudinally from the base of the wing, and is trifurcate at the tip; the basal striga is obsolete; the second one is obliquely waved, and blackish; the third is much curved and dentated, with two black lines crossing it, as in the preceding species, forming with it the characteristic marks above mentioned; the costa bears several oblique, dusky bars, indicating the place of the strigæ; and the space between the stigmata bears another black letter-like mark; the hind wings are whitish, or white, with a rather darker but almost obsolete border. The cilia of all the wings is marked with brownish spots.

The caterpillar is hairy and black, with red and white spots on the sides, and a yellow band down the back; the fourth segment of the body with a conical black tubercle; the four segments red above the feet. It feeds on plum, sloe, whitethorn, etc.; and the perfect insect appears in May and June, and is commonly found on the trunks of trees, palings, etc.

SPECIES 12.—ACRONYCTA CUSPIS?

SYNONYME.—*Noctua cuspis*, Hübner? Treitschke; Stephens; Wood, Ind. Ent., pl. 52, fig. 1666.

Mr. Stephens notices an insect in Mr. Hatchett's collection, taken near Dulwich, which he doubtingly gives as the A. cuspis; describing it as "very similar to the foregoing, but rather larger, cinereous, with a black, lateral, thoracic line; anterior wings greyish-white, a little tinted with luteous, with a strongly ramose, black lineola at the base, and a powerful, undulated, black, posterior striga, in which are two dark ψ-like marks; the stigmata are nearly as in the last, and the cilia whitish-ash, spotted with black; posterior wings whitish, with a dusky central lunule; transverse striga beyond the middle and posterior fimbria."

BRYOPHILA, OCHSENHEIMER.

The species of this genus (of which we only possess two in this country) are distinguished from all the preceding Noctuidæ by their small and delicate forms; the antennæ simple; the palpi extending upwards as high as the forehead, the last joint distinct; the thorax small; the abdomen slender and crested; the wings rather broad, with transverse lines and ordinary markings. The caterpillars are slender, cylindrical, having the body marked with small, slightly-pilose tubercles; they feed on lichens growing on trees and walls, during the night, hiding themselves by day. Both this and the following genera bear an evident affinity to the species of Miselia.

SPECIES 1.—BRYOPHILA GLANDIFERA. PLATE XLI., FIG. 8, AND PLATE XLII., FIG. 19.

SYNONYMES.—*Noctua glandifera*, Wien. Verz.; Hübner; Ochsenheimer; Stephens; Wood, Ind. Ent., pl. 14, fig. 322.
Noctua Lichenes, Fabricius; Donovan, 7, pl. 223, fig. 3.

This species measures from 11 to 14 lines in the expanse of the fore wings, which are of a pale green colour, with various black markings edged with white; the costa has ten or eleven black spots; at the base of the wing within is a black semicircular line; the anterior stigma is brown, and communicates with a patch behind it of the same colour, being also edged with black lines, of which there are two short ones between the stigmata; the outer stigma is small and brown, followed by a curved, slender, white striga, edged within with black dots, and followed by a brown cloud; the subapical striga indicated by a black catenated line, bearing two conical patches; the cilia is spotted with black. The hind wings brown, with white ciliæ. The species is, however, very variable, some specimens having all the black markings almost obliterated, and the hind wings of a paler colour. Others, also, differ in the ground-colour of the wing being whitish, or even dirty buff or reddish.

The caterpillar is of a buff-brown, with black spots and a pale line down the back. It feeds on lichens, and the moth appears at the end of June, July, and beginning of August, and is an abundant species.

SPECIES 2.—BRYOPHILA PERLA. PLATE XLI., FIG. 10.

SYNONYMES.—*Noctua perla*, Wien. Verz.; Hübner; Haworth; Ochsenheimer; Stephens; Wood, Ind. Ent., pl. 14, fig. 323.
Noctua glandifera, Borkhausen.

This species is smaller than the preceding, not measuring more than 1 inch in the expanse of the fore wings, which are of a pale ashy-white, with darker spots and blackish markings; the anterior striga is much angulated, enclosing a dark basal patch; the second striga is a slender black dentated transverse line, followed by a large dusky patch representing the anterior and supplemental stigma; the former being round and partially edged with white. The posterior stigma forms a similar but smaller patch, beyond which is a much-elbowed and dentated black line representing the third striga; the subapical one consisting of a few black dots. Cilia slightly spotted with brown at the base.

This is also an extremely variable species, both in the intensity of the markings and the ground-colour of the wings; the hind wings are ashy-white, with a central dusky lunule and a dusky border, in which are sometimes a row of white dots. The caterpillar is yellowish-grey, with a black head; it feeds on lichens, and the moth appears in July and August, sitting on walls and palings. It is a very common species round London and elsewhere.

DIPHTHERA. Hübner.

The antennæ are alike in both sexes, the under side slightly crenulated; the palpi are rather long and slender; the head clothed with compact scales; the maxillary spiral tongue nearly as long as the antennæ; the thorax rounded; the abdomen rather slender and tufted; the fore wings ample and beautifully varied in colours and markings; and the caterpillars clothed with long hairs like those of the Arctiidæ: they feed upon the leaves of trees.

SPECIES I.—DIPHTHERA ORION. Plate XLI., Fig. 11, and Plate XLII., Fig. 112.

Synonymes.—*Noctua Orion*, Esper; Curtis, Brit. Ent., pl. 404; Harris, Aurelian, pl. 42, fig. e; Stephens; Wood, Ind. Ent., pl. 14, fig. 324.

Noctua runica, Gmelin; Ochsenheimer; Haworth.

Ph. Noct. aprilina, Fabricius; Hübner; Panzer; Donovan, vol. 10, pl. 347, fig. 1.

Like the species of the genus just described, the present insect is vary variable in its markings, which has led to much confusion in its synonymes; and I believe English authors are not yet decided whether our native specimens do not constitute two species, although a contrary opinion prevails on the Continent. The expansion of the fore wings is between $1\frac{3}{8}$ and $1\frac{1}{2}$ inch, and they are of a lovely green colour, with two longitudinal white stripes, and various black markings. The basal striga is obsolete; the second is composed of a semicircular series of black confluent patches; there are also two large black patches of irregular form in the middle of the wing, the front one of which comprises the two stigmata, and extends to the costa. The third striga is formed of a broad irregular black crenulated bar, bearing several white spots within and two brown patches without, and with two or three subapical black dots, and a row of black and white marginal spots. The hind wings are brown, with a broad dark border; the cilia of all the wings spotted with black and white. The caterpillar is blackish-brown, with three pale stripes across the back, and each segment with a row of red piliferous tubercles between, and a row of small white dots. It feeds on the oak, birch, etc., in the autumn, and the perfect insect appears in May and June, being found on the trunks of trees. It is a rare species, although very widely dispersed throughout the country.

Phalæna Noctua ludifica, Linnæus (Wood, Ind. Ent., pl. 54, fig. 46), has been improperly introduced into the British lists. Its fore wings are greenish-white, with various black markings, and its abdomen yellow, spotted with black. It is a native of the middle of Europe.

THYATIRA, Ochsenheimer.

The antennæ are nearly alike in both sexes, clothed beneath with short hairs; the palpi are longer than the head, and porrected, with the third joint exposed; the head rather broad; the thorax with a transverse crest; the abdomen slender and tufted at the tip; the wings broad and obtuse, with the ordinary characteristic markings of the family obliterated. Two species have been united together under this generic name, but not only do they differ very materially from each other in their general appearance, but also in the structure of their feet, T. Batis having the fore legs fasciculose, and T. derasa the intermediate ones. The caterpillars also are so much unlike each other, hat it is with great hesitation that I leave them under the same generic name.

SPECIES 1.—THYATIRA BATIS. PLATE XLI., FIG. 13, and PLATE XLII., FIG. 114.

SYNONYME.—*Phal. Noctua Batis*, Linnæus; Donovan, Brit. Ins., pl. 1, pl. 33, fig. 1; Curtis, Brit. Ent., pl. 72; Harris, Exposition, pl. 13, fig. 3; Stephens; Wood, Ind. Ent., pl. 14, fig. 326.

This lovely insect measures about 1½ inch in the expanse of the fore wings, which are of a brown colour, marked with five large rosy patches; one at the base with brown clouds, two on the costa near the apex, another small one on the inner margin towards the middle, and the fifth on the anal angle, these having a brownish disk. On the dark part of the wing may be traced the rudiments of several dentated lines, and the apical margin is sometimes marked with rosy lunules. The hind wings are brown, with the base and a broad bar across the middle pale.

The caterpillar is of a brown-red colour, anteriorly and posteriorly gibbose, with the third segment with a bifid tubercle, and a pale zig-zag line down the side. It feeds on the common bramble, and the moth appears in June and July. It is found in woods in various distant parts of the country, but is rather scarce.

SPECIES 1.—THYATIRA DERASA. PLATE XLI., FIG. 15, AND PLATE XLII., FIG. 116.

SYNONYME.—*Phal. Noctua derasa*, Linnæus; Donovan, 7, pl. 223, fig. 1; Hübner; Stephens; Wood, Ind. Ent., pl. 14, fig. 325.

This singularly-marked moth measures from 1½ to 1⅔ inch in the expanse of the fore wings, which are very pale slaty-buff at the base, with a white oblique bar connected with a streak which runs to the base. The middle portion of the wing is fulvous, with the costa whitish; the stigmata are very small and edged with brown; beyond the middle are several rows of very delicate deeply-waved lines; towards the apex of the costa is a whitish abbreviated transverse line, and another white stripe runs from the apical to the anal angle of the wing, the apical margin with a row of fine ovate lunules and dark dots; the hind wings are brown, with a pale transverse striga. The caterpillar is destitute of tubercles, with the extremity of the body attenuated; it is of a reddish or fulvous colour, with darker lines and several pale spots on the sides. It feeds on the bramble, and the moth appears in July and August. It is not a common although a very widely-dispersed species.

SCOLIOPTERYX, GERMAR. GONOPTERA, LATREILLE. CALPE, TREITSCHKE. CALYPTRA, OCHSENHEIMER.

This genus is well distinguished from all other Noctuidæ by the singular dentate apical margin of its fore wings, and its pectinated male antennæ; the palpi are long and much elevated, forming a short beak, with the third joint long and exposed; the thorax is crested in front. The caterpillar is slender, elongated, cylindrical, and with a small head. It feeds on the leaves of trees, and the chrysalis is folliculated.

SPECIES 1.—SCOLIOPTERYX LIBATRIX. PLATE XLI., FIG. 17, AND PLATE XLII., FIG. 118.

SYNONYME.—*Phalæna Noctua libatrix*, Linnæus; Donovan, vol. 6, pl. 216; Hübner; Albin, pl. 32, fig. 5, *a—c*; Harris, Exposition, pl. 1, fig. *c—f*; Duncan, Brit. Moths, pl. 24, fig. 1; Wood, Ind. Ent., pl. 14, fig. 327.

This species measures about 1⅔ inch in the expanse of the fore wings, which are of a reddish-grey colour, much irrorated with brown speckles, with the basal half more strongly tinged with fulvous; there is a white dot at the base, and another near the middle of the wing. There is a slender, slightly-waved pale striga before, and another more oblique, beyond the middle of the wing, edged with brown; and between the latter and the apical margin runs a very much serrated, but much less distinctly marked, subapical striga; the hind wings are brown, with an obscure striga beyond the middle; the tarsi are white. The hind wings beneath are beautifully irrorated with dark markings. The caterpillar is green, with a whitish lateral line. It feeds on willows and poplars, and the moth appears at different periods of the year; April and July, and June and September, being given as the periods of its imago state. It is a very abundant species in the southern portion of the kingdom.

DESCRIPTION OF PLATE XLIII.

INSECTS.—Fig. 1. Ceratopacha fluctuosa (the satin carpet).
" Fig, 2. Ceratopacha duplaris (the lesser satin carpet).
" Fig. 3. Ceratopacha diluta (the lesser lutestring). 4. The Caterpillar.
" Fig. 5. Ceratopacha Or (the poplar lutestring). 9. The Caterpillar.
" Fig. 6. Ceratopacha octogesima.
" Fig. 7. Ceratopacha flavicornis (the yellow horned). 8. The Caterpillar.
" Fig. 9. Ceratopacha ridens (the frosted green). 10. The Caterpillar

C. Fluctuosa, C. Duplaris, and C. Ridens are from the cabinet of Mr. Marshall; C. Octogesima from the cabinet of Mr. Bentley; and the others are from specimens furnished me by Mr. H. Doubleday. The caterpillars are from Hübner. H. N. H.

CERATOPACHA (CEROPACHA, STEPHENS, TETHEA P. CURTIS).

The genus Tethea of Ochsenheimer, or Cymatophora of Treitschke, having been found to require subdivision, it is unfortunate that modern Lepidopterists have not adopted some regular plan in respect to the nomenclature of its subdivisions; as it is, each has adopted a different mode of dealing with the old synonymous names, and consequently each has a different series of names for the groups in question. As the insects composing the present group are not the types either of Ochsenheimer or Treitschke's generic names, I have followed Mr. Stephens in preference to Boisduval. In this group, the fore wings are either obtuse or angulated, with several waved transverse lines; the antennæ simple in both sexes, stout, short, and rather depressed in the middle, very pubescent beneath; the palpi horizontally porrected, with the terminal joint rather long and slender; the abdomen variable in thickness; the thorax rather broad, with the tippets elevated so as to appear bifid. The caterpillars are pale-coloured, punctured and depressed, the head broad, cordate, and variously coloured.

SPECIES 1.—CERATOPACHA FLUCTUOSA. PLATE XLIII., FIG. 1.

SYNONYME.—*Noctua fluctuosa*, Hübner; Haworth; Treitschke; Curtis; Stephens; Wood, Ind. Ent., pl. 14, fig. 328.

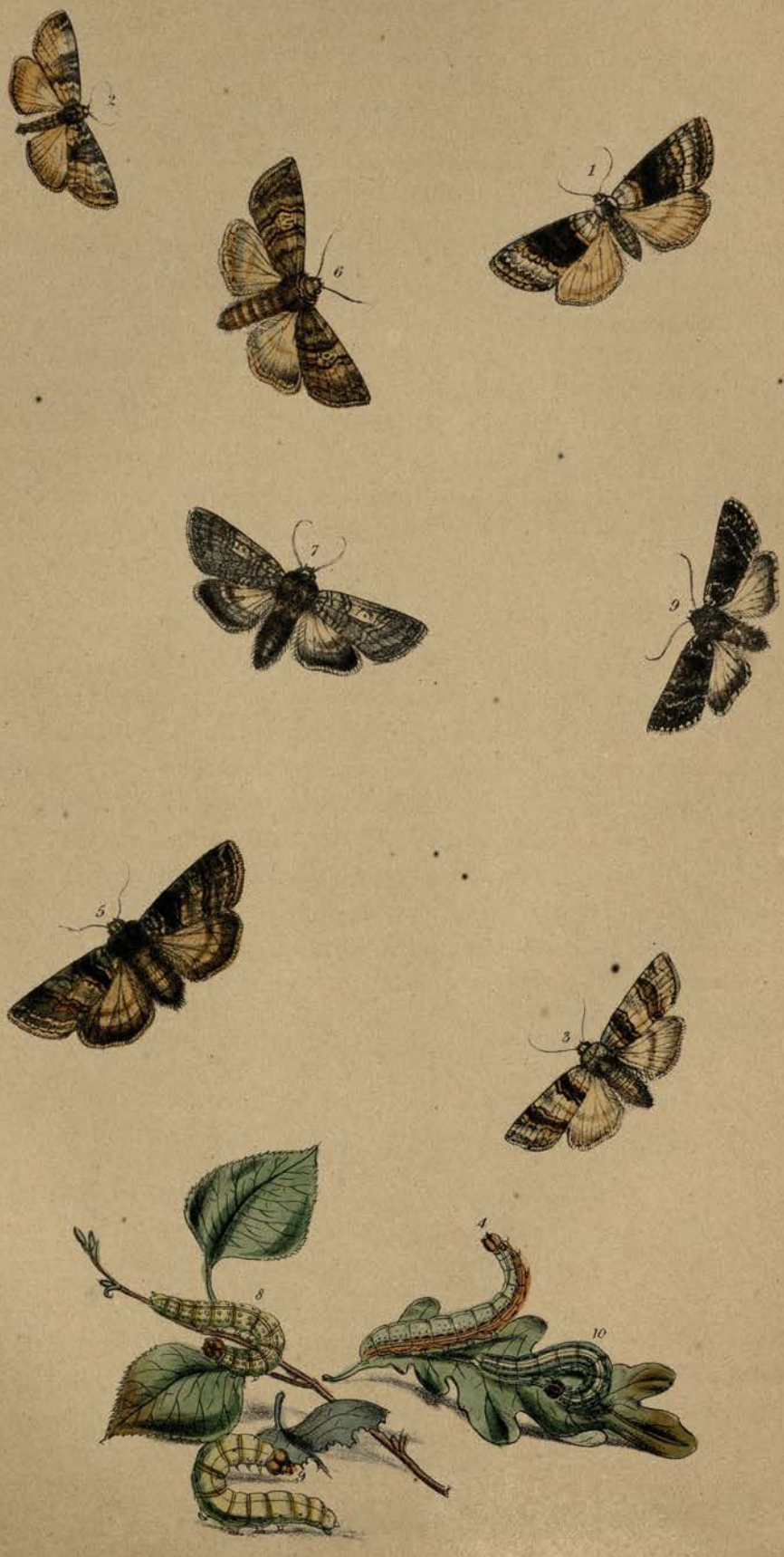
This species varies from 1⅓ to 1⅔ inch in the expanse of the fore wings, which are of an ashy-white colour; the base pale, with a brown striga and spots, beyond which is a broad brown straight bar, extending beyond the middle of the wing, in which are two flexuous black strigæ, and a black lunule, externally white, occupying the place of the outer stigma; beyond the fascia is a clear brownish striga finely denticulated, the apical margin dusky, in which is a pale denticulated striga; the anterior stigma is obsolete; the hind wings are whitish, with a pale dusky fimbria; the body is slender.

The caterpillar is yellowish-white, with a dark brown head; it feeds on the birch. The perfect insect appears about the middle of June, frequenting the skirts of woods in the southern counties.

SPECIES 2.—CERATOPACHA DUPLARIS. PLATE XLIII., FIG. 2.

SYNONYMES.—*Tinea duplaris*, Linnæus; Haworth; (*Noctua d.*) Stephens; Wood, Ind. Ent., pl. 14, fig. 329.
Noctua bicolor, Esper.
Noctua bipuncta, Borkhausen; Treitschke; Boisduval; Guênée; Doubleday.
Noctua undosa, Hübner.
Noctua binotata, Fabricius.

This species varies from 1¼ to 1½ inch in the expanse of the fore wings, and is very closely allied to the preceding insect, but it is smaller and darker in the colour of the wings, and has two small black dots in the place of the outer stigma instead of the dusky lunule; the apex of the fore wings is much more broadly saturated with dusky brown. The caterpillar is yellowish-green, with a red line down the back, and reddish-brown head; it feeds on the poplar. The moth appears at the same time and places as the preceding, but is much more common. Darenth, Ripley, Petworth, New Forest, Epping, etc.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SPECIES 3.—CERATOPACHA DILUTA. PLATE XLIII., FIG. 3, 4.

SYNONYMES.—*Noctua diluta*, Wien. Verz.; Fabricius; Hübner; Haworth; Stephens; Wood, Ind. Ent., pl. 14, fig. 330; Harris, Aurelian, pl. 35, fig. f, g.

Noctua octogena, Esper, pl. 128, fig. 6.
Bombyx undulata, Fabricius.
Bombyx fasciculosa, Borkhausen.

This species also measures from 1¼ to 1½ inch in the expanse of the fore wings, which are of a pale green-brown colour, with two straight bars, composed of slender strigæ, close together; these fasciæ are of a reddish colour, and are generally edged by an undulating line of white and another of black, one of the fasciæ being placed before and the other beyond the middle of the wing, and between these fasciæ there is generally a flexuous brown striga; the apical margin of the wing is obscure, with a pale waved striga. The hind wings are whitish, with an ashy central fascia and a rather broad fimbria; the ciliæ whitish, and the body rather slender. The caterpillar is pale greyish, spotted with white, with a red-brown head, and pale dorsal and lateral lines above the feet. It feeds on the oak; changes to a chrysalis at the beginning of June, in a cocoon attached to a leaf, and the moth appears in August, frequenting woods in the south of England, but it is a rare species.

SPECIES 4.—CERATOPACHA OR. PLATE XLIII., FIG. 5 (and 9, at the bottom of the Plate).

SYNONYMES.—*Noctua or*, Wien. Verz.; Fabricius; Hübner; Treitschke; Duponchel; Stephens; Wood, Ind. Ent., pl. 14, fig. 331.
Noctua flavicornis, Haworth, but not of Linnæus.
Noctua octogena, Esper, pl. 128, fig. 5.

Noctua consobrina, Borkhausen.
Noctua gemina, Beckwith, Linn. Trans., 2, pl. 1, fig. 4—6; Donovan, Brit. Ins., 10, pl. 347, fig. 3.
Noctua ♂ Græcum, Villers.

This species measures from 1½ to 1⅝ inch in the expanse of the fore wings, which are of a grey colour, with flexuous brown strigæ, the first of which is geminated and placed at the base of the wing; then follow three or four close together, forming a fascia; the middle of the wing is rather paler, bearing the two ordinary stigmata, the first of which is pale and round, with a dusky centre, resembling the letter O, and the outer one is shaped something like the letter R (whence the specific name); beyond these are three other equidistant strigæ, of which the two outer ones are much paler and less flexuous, the outer one connected with a dark, hook-shaped line at the tip of the wing. The apical margin is dusky, with a slightly-waved pale striga. The hind wings brown, with a dark fascia and marginal fimbria. The caterpillar feeds on the poplar, and is green, with a brown head. The perfect insect appears at the end of May or beginning of June, in the woods round London, but it is of rare occurrence.

SPECIES 5.—CERATOPACHA OCTOGESIMA. PLATE XLIII., FIG. 6.

SYNONYMES.—*Noctua octogesimâ*, Hübner; Stephens; Hübner, 3, pl. 27, fig. 2; Treitschke; Boisduval; Wood, Ind. Ent., pl. 14, fig. 332.

Noctua octogena, Esper, pl. 128, fig. 4; Curtis, Brit. Ent., pl. 272.
Noctua or, Borkhausen.

This species measures 1½ inch in the expanse of the fore wings, which are of a pale ochre colour varied with brown, and having a rosy tint, especially at the base, which is marked with two slender pale and two black irregular stripes running parallel to each other, the inner one being spotted with black. The stigmata are contiguous, composed of black and white markings resembling the figures 80 or 08 (whence the specific name); a brown dentate striga rests on the outer stigma, beyond which are two black and several dusky slender strigæ, with a black oblique line at the tip of the wing; the apical margin has also a slender black line. The hind wings paler, with two obscure slender fasciæ and a dusky fimbria. The caterpillar is green, with a yellow head and two white lines at the sides of the body; it is found on the poplar in the autumn, and the moth appears in April and May; it has been taken near Bristol, Birmingham, and Netley.

SPECIES 6.—CERATOPACHA FLAVICORNIS. PLATE XLIII., FIG. 7, 8.

SYNONYMES.—*Phalæna Noctua flavicornis*, Linnæus; Hübner; Donovan, 10, pl. 352, fig. 3; Stephens; Wood, Ind., Ent., pl. 14, fig. 333.
Noctua luteicornis, Haworth.

This species measures 1½ inch in the expanse of the fore wings, which are elongated, rather narrow, and

obtuse. The posterior ones short, as is also the body. The fore wings are ashy-coloured, with black strigæ; at the base of the wing is a duplicated black striga, occasionally obsolete, followed by a second, which is oblique and also geminated; the anterior stigma is large and pale-coloured, with a pale dusky centre and margin; the outer one almost obsolete, followed by a duplicated striga angulated in the middle, whilst a fourth undulated simple striga extends from the apex to the anal angle of these wings. The hind wings ashy-brown, with a central fascia, and the margin dusky; the antennæ bright clay colour, and the thorax very hairy. There is considerable difference in the distinctness of the strigæ in different specimens. The caterpillar is greenish-yellow and speckled, with a red-brown head, and with a pale lateral and dorsal line; it feeds on the birch, poplar, and oak, rolling up the leaves. The moth appears in March and the beginning of April, and is found on the trunks of those trees; it is a rare species, but taken occasionally in the woods round London.

SPECIES 7.—CERATOPACHA RIDENS. PLATE XLIII., FIG. 9 (the middle right-hand figure) AND FIG. 10.

SYNONYMES.—*Noctua ridens*, Fabricius; Haworth; Duponchel; Stephens; Wood, Ind. Ent., pl. 14, fig. 334.
Noctua Xanthoceros, Hübner.
Noctua chrysocera, Beckwith, Linn. Trans., 2, pl. 1, fig. 1—3.
Noctua erythrocephala, Esper.
Noctua flavicornis, Wien. Verz.
Noctua Putris, Naturforscher, Stuck 8, p. 108.

This species measures about 1½ inch in the expanse of the fore wings, which are of a sulphur colour, with olive and brown markings; a large distinct spot of white at the base of the wing, which extends to a whitish undulating striga; the stigmata are distinct, and followed by a second whitish undulating striga; towards the apical margin the wing is marked with whiish lineolæ and black lunules; the hind wings are whitish, with a dark border. The markings vary very much; fine specimens having the pale dentated undulating lines very distinct, but in others they are so blended with the darker shades as nearly to obliterate all the markings, when the moth appears of a dirty olive colour, with indistinct markings. The caterpillar is smooth and of a pale yellow-green, with two rows of white specks on each side; the head is red; it feeds on the oak, enclosing itself between two or three leaves spun together, generally keeping itself in a curved position when at rest; it is full-grown at the end of June, when it encloses itself in a weak cocoon, usually among the leaves, the moth appearing in April. It is a rare species, but was reared by Beckwith from caterpillars taken at Brentwood, Essex. Also found in the woods round London, and in the New Forest, etc.

DESCRIPTION OF PLATE XLIV.

INSECTS.—Fig. 1. Plastenis subtusa (the olive moth). 4. The Caterpillar.
" Fig. 3. Plastenis retusa (the double kidney). 2. The Caterpillar.
" Fig. 5. Cleoceris viminalis (the minor shoulderknot).
" Fig. 6. Cleoceris Oo (the scallop-winged oak moth). 7. The Caterpillar.
" Fig. 8. Cosmia Pyralina (the lunar spotted pinion). 9. The Caterpillar.
" Fig. 10. Cosmia diffinis (the white spotted pinion). 11. The Caterpillar.
" Fig. 12. Cosmia affinis (the lesser spotted pinion).
" Fig. 13. Cosmia Trapezina (the dun bar).
" Fig. 14. Cosmia Fulvago (the angle striped sallow).

Figs. 1, 3, 5, 10, and 14 are from the cabinet of Mr. Marshall. Figs. 6, 12, and 13 are from specimens furnished me by Mr. H. Doubleday; and fig. 8 is from the cabinet of Mr. Bentley. The caterpillars of Diffinis and Pyralina are from the accurate work of Freyer; the others are from Hübner. H. N. H.

PLASTENIS, BOISDUVAL. TETHEA, STEPHENS, GUENÉE.

As the generic names Tethea and Cymatophora are synonymous, I consider it incorrect to retain both for sections into which the old genus to which they were applied has been separated, and accordingly adopt M. Boisduval's name for this group, which is characterised by the fore wings being slightly hooked at the tip.

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The antennæ but slightly subdenticulated in the male, the thorax rounded and slightly crested, the wings marked with straight transverse subparallel strigæ. The caterpillars are green, flat beneath, attenuated behind, with a small subglobose head, and which feed between rolled-up leaves; the cocoon is of a very slight texture.

SPECIES 1.—PLASTENIS SUBTUSA. PLATE XLIV., FIG. 1, 4.

SYNONYME.—*Noctua subtusa*, Wien. Verz.; Fabricius; Hübner; Haworth; Stephens; Wood, Ind. Ent., pl. 14, fig. 335.

This species measures from 1 to 1¼ inch in the expanse of the fore wings, which are of a pale ashy-buff or brownish-olive tinge, with a pale yellowish abbreviated striga towards the base. Another similar straight, slender transverse one before the middle, succeeded by the stigmata, which are large, wide apart, and slightly darker than the rest of the wing, with pale yellow edges, the supplemental one being present and resting on the second striga; the third striga is distant, slender, yellow, and slightly bent; the fourth ordinary striga is almost obsolete; the hind wings are similarly coloured, without any markings. The caterpillar is a very pale green, speckled with white and with yellow longitudinal lines; the head black varied with white. It feeds on the poplar, and the moth appears in July, frequentiug the trunks of the same trees. It is rather rare, but occurs in the woods round London.

SPECIES 2.—PLASTENIS RETUSA. PLATE XLIV., FIG. 2 AND 3. (LARVA.)

SYNONYMES.—*Phalæna (Noctua) retusa*, Linnæus; Hübner; Haworth; Ochsenheimer; Stephens; Wood, Ind, Ent., pl. 14, fig. 336.

Phalæna (Noct.) chrysoglossa, Beckwith, in Linn. Trans., 2, pl. 10, fig. 10, 11; Donovan, 10, pl. 350, fig. 2; Stewart.

Phal. Noct. vetula, Hübner *teste* Haworth.

This species measures about an inch in the expansion of the fore wings, which are rather hooked at the tips, and of a greenish-brown hue, with three oblique but regular strigæ of a darker brown colour, edged within with white, namely, two towards the base of the wing, and a third beyond the stigmata; the apical portion of the wing being brown, within which runs a rather faint undulating fourth striga; between the stigmata, also towards the inner margin of the wing, runs an irregular brown bar. The two ordinary stigmata are accompanied by a third teliform one, which is, however, almost obsolete, almost extending from the striga preceding to the one following the stigmata. The hind wings are brown, with the margin slightly darker. The ciliæ pale rufescent. The caterpillar is of a beautiful green colour, through the transparent skin of which the intestines are easily seen. It is very slender and elongated, and in its motion slightly imitates the larvæ of the Geometridæ. It is found on the great round-leaved willow, and the sallow, in the middle of June; and the moth appears in the following month. It is not a common species.

NOCTUA GRACILIS of Haworth is retained as a species by Curtis, Stephens, and Wood (pl. 14, f. 337), although Stephens, as well as Haworth, considers it as a probable variety of the preceding insect; it is, however, rather larger, measuring thirteen lines in expanse; the body longer and more slender; the wings of a brown colour, with the strigæ less distinct, the subapical one being entirely obsolete. Found in the middle of July on the trunks of trees.

CLEOCERIS, BOISDUVAL. BOMBYCIA AND CYMATOPHORA, STEPHENS.

As there are some doubts respecting the propriety of the employment of Hübner's name Bombycia (especially as the group here adopted is not of the same extent as it is found in Mr. Stephens's Illustrations), and as neither of the insects to be described in the present group are the types of Treitschke's genus Cymatophora, I have adopted both the views and name of Boisduval. The antennæ are bipectinated in the males and serrated

in the females; and the fore wings are entire, with the apical margin rounded. The thorax is not crested, and the larvæ are naked and smooth, attenuated in front, with a small head. They live in a case of leaves fastened together.

SPECIES 1.—CLEOCERIS VIMINALIS. PLATE XLIV., FIG. 5.

SYNONYMES.—*Noctua viminalis*, Fabricius; Godart; Stephens; Wood, Ind. Ent., pl. 14, fig. 338.
Noctua Saliceti, Borkhausen; Treitschke.
Bombyx stricta, Esper.
Bombyx scripta, Hübner; Haworth.

This species measures from 1½ to 1¾ inch in the expanse of the fore wings, which are of a shining hoary tinge, with ashy and brown clouds, and a black line at the base. The two ordinary and also the supplemental stigmata are present; being, however, chiefly indicated by their black and interrupted margins. The apical margin is marked with a row of small black lines; and the ciliæ are hoary, as well as the hind wings, with a slender black and nearly continuous line along the margin. The ciliæ hoary. Varieties occur in which the fore wings are of a much darker hue, and others brilliantly suffused with purple; and the hind ones brown or brownish, with the marginal striga more interrupted. The caterpillar is green with slender pale lines, and a dark varied head. It feeds on willows; and the moth appears in June or July, frequenting woods. It is not a common species.

Obs.—The palpi in this species are very short and porrected horizontally; and the abdomen of the female short and obtuse.

SPECIES 2.—CLEOCERIS OO. PLATE XLIV., FIG. 6, 7.

SYNONYMES.—*Phalæna Bombyx Oo*, Linnæus; Wilkes, pl. 11; Donovan, 5, pl. 179; Boisduval; Stephens; Wood, Ind. Ent., pl. 14, fig. 339.
Noctua ferruginago, Hübner; Haworth.
Noctua renata, Fabricius (variety).
Noctua renago, Haworth (variety).

This pretty insect measures from 1¼ to 1½ inch in the expanse of the fore wings, which are of a pale yellowish-buff, with a patch of brownish colour towards the base of the wing, almost obliterating the basal striga, which appears on the costa; the second striga is very much angulated and pale, edged behind with a reddish-brown line. The characteristic part of the wing bears the three stigmata, the supplemental one being oval, and longer than the anterior one. A brownish deeply-elbowed fascia runs through the centre of this part of the wing, resting upon the inner edge of the outer stigma. The third and fourth strigæ are distinct, consisting of rows of small dark lunules. The hind wings are almost colourless. Varieties occur in which the ground-colour of the wings is much darker. The caterpillar is of a reddish-brown colour, with white lines and oval spots, and the head black. It feeds on the oak; and the moth appears in May and June, being found on the trunks of trees. It is rather an uncommon, although widely dispersed, species.

Obs.—The palpi in this species are ascending, and the abdomen of the female is long and acute.

COSMIA, OCHSENHEIMER. COSMIA AND EUPERIA, GUENÉE.

This genus differs from the preceding in its simple antennæ. The palpi are of moderate length and ascending, with the terminal joint exposed. The thorax is not crested; and the abdomen is tufted at the apex in the males. The fore wings are truncated, or but very slightly hooked on the apical margin; they are deflexed in repose, and are marked in the middle with a trigonate or trapeziform patch. The larvæ are green striped with white; they are elongated, attenuated towards the head, with a small head; living amongst the leaves of trees. M. Guénée separates the C. trapezina fulvago, and some other allied species, into a separate genus under the name of Euperia, considering them as far removed in the system from the other species. (Ann. Soc. Ent. France, 1839, p. 487.)

SPECIES 1.—COSMIA PYRALINA. PLATE XLIV., FIG. 8, 9.

SYNONYMES.—*Noctua pyralina*, Wien. Verz.; Hübner; Treitschke; Duponchel; Haworth; Hatchett, in Trans. of old Ent. Soc., vol. 1, pl. 9, fig. 1; Wood, Ind. Ent., pl. 14, f. 342. *Noctua corusca*, Hübner.

This species measures rather more than $1\frac{1}{3}$ inch in the expanse of the fore wings, which are of a rich purplish chestnut colour, with brown waves, the costa being marked towards the apex with a pale sublunate mark; this extends in a darker tint, and very much angulated, to the inner margin of the wing. Across the middle of the wing runs a much waved dark striga; the ordinary stigmata being obsolete. The apical margin of the wing is clouded with brown patches. The hind wings are pale reddish-brown, with a rather darker subapical fimbria. The caterpillar is green, with white lines and dots on the back. The perfect insect appears in July, and is of rare occurrence in this country. Birch Wood, Epping, Barham.

SPECIES 2.—COSMIA DIFFINIS. PLATE XLIV., FIG. 10, 11.

SYNONYME.—*Phal. Noctua diffinis*, Linnæus; Fabricius; Hübner; Haworth; Harris, Expos. Engl. Ins., pl. 5, fig. 8. Stephens; Wood, Ind. Ent., pl. 14, fig. 340.

This species measures about $1\frac{1}{4}$ inch in the expanse of the fore wings, which are of a rich purplish-red colour, but paler along the apical margin; towards the base of the wing is a short and slender, white, transverse striga, arising from the costa; a second slender, pale brown, straight striga running obliquely across the wing, rather before the middle, arising from a white, costal, curved patch; a similar but larger patch is placed half-way towards the apex of the wing, from the outer posterior angle of which runs a third striga, similar to the preceding, but parallel with the apical margin of the wing; near the apex of the costa is another less distinct, curved, pale line, which extends to the anal angle, forming a fourth striga; the ordinary stigmata are obliterated; the hind wings are brown. The caterpillar is green, with white lines and dots. It feeds on the elm; and the moth appears at the middle of August, being chiefly found on the trunks of trees. It is a rather common and widely-dispersed species.

SPECIES 3.—COSMIA AFFINIS. PLATE XLIV., FIG. 12.

SYNONYME.—*Phalæna Noctua affinis*, Linnæus; Hübner; Haworth; Albin, pl. 31, fig. 49, f—i; Stephens; Wood, pl. 15, fig. 341.

This species is smaller than the preceding, measuring about thirteen lines in the expanse of the fore wings, which are of a reddish-brown colour, the centre of the wing having a redder hue, but varying considerably in the depth of their tint, as well as in the intensity of their markings, which are very similar to those of C. diffinis, except that the white costal marks are replaced by slender short flexuous pale lines. The characteristic portion of the wing is also marked with slight indications of the two ordinary stigmata. Close to the apex of the wing are two minute black dots. The hind wings are dark brown, with the base rather paler; and the cilia pale and dirty white. The caterpillar is a greenish-white, with darker lines and small dark tubercles, and a black curved line over each of the spiracles. It feeds on the elm; and the moth, which is a common species, appears at the end of July.

SPECIES 4.—COSMIA TRAPEZINA. PLATE XLIV., FIG. 13.

SYNONYMES.—*Phalæna Noctua trapezina*, Linnæus; Hübner; Haworth; Stephens; Wood, Ind. Ent., pl. 15, fig. 343; Harris, Aurelian, pl. 10, fig. *n—r*. *Phalæna rhombica*, Hufnagle.

This species measures from $1\frac{1}{4}$ to nearly $1\frac{1}{3}$ inch in the expanse of the fore wings, which are of a pale buff colour, varying to a pale reddish-brown. The characteristic portion of the wing is large, and richer tinted than the remainder, and bounded towards the base by a nearly straight, slender, brown line, edged with a pale buff line. This part of the wing bears slight rudiments of the stigmata; the anterior being indicated by a small dark dot, and the outer one by two placed transversely and edged with pale margins. They are followed by a

strongly-curved pale slender striga, beyond which on the costa is a somewhat triangular greyish patch bounded by a dusky line, which indicates the rudiment of the submarginal striga. Along the apical margin is a row of minute black dots. The hind wings are shining, and variable in colour from brown to reddish, with a dusky margin.

The caterpillar is of a light transparent green or a dusky colour, with a line of light yellow along each side. It feeds on the oak, birch, and various other trees. It will, however, devour other caterpillars. When full-grown it spins up amongst the leaves, and changes to a red chrysalis, covered with a fine bloom, about the end of June; and the moth appears in July. It is a very abundant species. I have described and figured a singular anatomical peculiarity exhibited by this species in the Introduction to the Modern Classification of Insects, vol. ii. p. 395.

SPECIES 5.—COSMIA FULVAGO. PLATE XLIV., FIG. 14.

SYNONYMES.—*Noctua fulvago*, Wien. Verz.; Hübner; Treitschke; Duponchel; Stephens; Wood, Ind. Ent., 15, fig. 344, but not of Linnæus. *Noctua pallacea*, Esper. *Noctua gilvago*, Borkhausen. *Noctua angulago*, Hatchett, Ent. Trans. (old series), vol. i., p. 244, pl. fig. sup.; Haworth.

This species measures from $1\frac{5}{12}$ to $1\frac{2}{3}$ inch in the expanse of the fore wings, which are of a clay or yellow colour, marked at the base by a very short transverse striga. The second is angulated and reddish-brown, being placed before the middle of the wing, followed by the stigmata, which are pale and edged with a reddish-brown pale line; the outer one marked within with a dusky spot behind, which is rather darker clouded, extending to the inner margin of the wing. Beyond the stigmata is a much curved slender third striga. The apical portion of the wing being pale, or with a slightly-indicated subapical undulated pale line; the margin with dusky reddish spots more or less distinct. The under wings are pale yellowish. The caterpillar is green, with pale dorsal and lateral lines. It feeds on the birch; and the moth, which is extremely rare, appears in August. Taken occasionally at Birch Wood, Kent.

DESCRIPTION OF PLATE XLV.

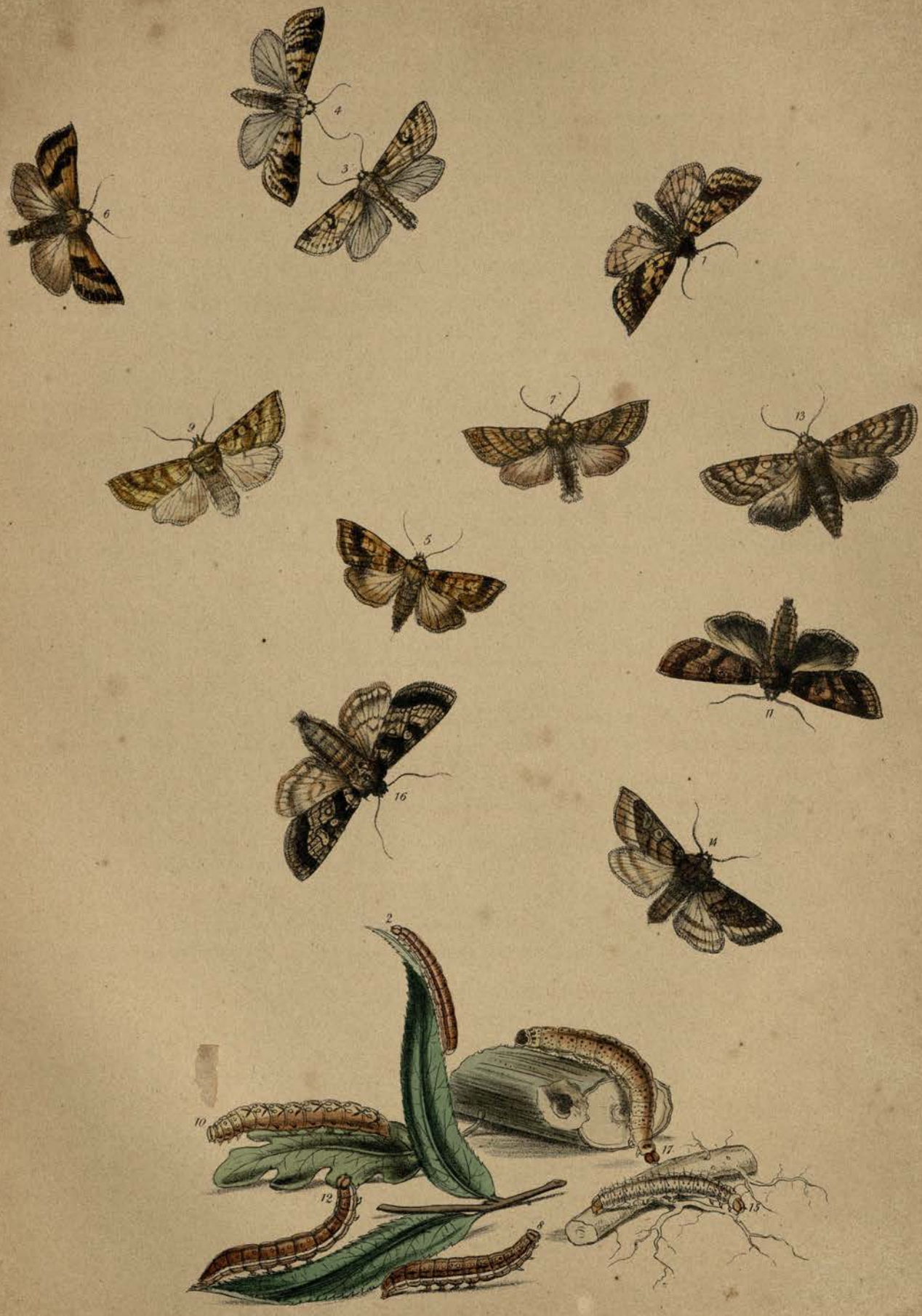
INSECTS.—Fig. 1. Xanthia flavago (the pink-barred sallow). 2. The Caterpillar.
" Fig. 3. Xanthia fulvago (the sallow). 4. A more strongly-marked variety.
" Fig. 5. Xanthia aurago (the barred sallow).
" Fig. 6. Xanthia centrago (the centre-barred sallow).
" Fig. 7. Xanthia citrago (the orange). 8. The Caterpillar.
" Fig. 9. Xanthia croceago (the orange upper wing). 10. The Caterpillar.
" Fig. 11. Orbona rufina (the flounced rustic). 12. The Caterpillar.
" Fig. 13. Orbona ferruginea (the brick-coloured moth).
" Fig. 14. Gortyna micacea (the rosy rustic). 15. The Caterpillar.
" Fig. 16. Gortyna flavago (the frosted orange). 17. The Caterpillar.

Fig. 1 is from the cabinet of Mr. Marshall. Figs. 11, 13, and 14 are from specimens furnished by Mr. H. Doubleday, and all the others are from the cabinet of Mr. Bentley.

The caterpillars of X. flavago, G. micacea, that of X. croceago from Duponchel, and the others from Hübner. H. N. H.

XANTHIA, HÜBNER.

This genus is distinguished by the setaceous antennæ, ciliated with hairs beneath, the palpi obliquely projecting, the terminal joint short and obtuse, the thorax crested, the fore wings generally of a bright yellow or occasionally red colour; they are deflexed at the sides of the body while at rest, and are slightly hooked at the tip. The caterpillars are glabrous, thick, and fleshy, with the first segment scutellated; the others, with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small tubercles; in some species they are obliquely fasciated. They generally feed on the leaves of trees, rarely on low-growing plants. The perfect insects are autumnal.

SPECIES 1.—XANTHIA FLAVAGO. PLATE XLV., FIG. 1, 2.

SYNONYMES.—*Noctua flavago*, Fabricius; Haworth; Curtis; Stephens; Wood, Ind. Ent., pl. 15, fig. 345; Albin, pl. 68, fig. *a—d*.
Noctua togata, Esper.
Noctua ochraceago, Borkhausen.
Noctua silago, Hübner; Guénée; Doubleday; Boisduval.

This species measures $1\frac{1}{4}$ inch in the expanse of the fore wings, which are of a rich golden-yellow colour, with various spots, dots, and a spotted oblique fascia, beyond the middle of the wing, of a purple-brown colour; of these spots, one at the base is large and costal, a central flexuous mark in the middle of the wing; the inner stigma is almost obsolete, the outer one marked by a dark dot in its hind part; the striga following the stigmata is of yellow, bordered on each side with dark spots; towards the apical margin is a row of brownish spots; the ciliæ are purplish; the hind wings are white, with yellowish ciliæ.

The caterpillar is pale brown, with a darker lateral stripe, and the belly pinkish. It feeds on sallow, and also on plantain. The moth appears in September and October, frequenting the woods round London, where it is not a rare species. Mr. Douglas has taken it from ivy blossoms.

SPECIES 2.—XANTHIA FULVAGO. PLATE XLV., FIG. 3, 4.

SYNONYMES.—*Phalæna Noctua fulvago*, Linnæus; Fabricius; Haworth; Curtis; Stephens; Wood, Ind. Ent., pl. 15, fig. 346; Albin, pl. 38, fig. 62, *a—d*.
Ph. N. crocea, Villers.
Noctua flavescens, Esper; Borkhausen.
Noctua cerago, Hübner; Treitschke; Borkhausen; Guénée; Duponchel; Boisduval.
Phalæna Noct. rubago, Donovan, 10, pl. 338, fig. 2.
Phalæna citrago, Wilkes, 5, pl. 8.

This species measures from $1\frac{1}{4}$ to $1\frac{5}{12}$ inch in the expansion of the fore wings, which are of a more or less bright sulphur-yellow colour, varied with purple-brown markings; of these, a patch on the costa towards the base (behind which is a small spot) is succeeded by a slender and but slightly-indicated waved striga, preceding the anterior stigma, which is almost obsolete, the slender circle by which it is margined alone being visible; beyond this is a deep curved purple-brown fascia, the chief spot of which appears to represent the outer stigma; the third ordinary striga is represented by a yellow much curved line preceded and followed by some small dark triangular or arched spots, which are dilated on the costa, with a large triangular patch extending nearly to the tip of the wing; parallel with the apical margin runs a row of small brown spots. Varieties, such as our fig. 3, occur, in which the dark-coloured markings are much less extensive, and others darker; other varieties have the ground-colour varying in intensity; the hind wings are pale whitish-buff. The caterpillar is pale, with a brown head. It feeds on birch; and the moth appears in September and October. It is a rather common species, and is found in woods and on ivy blossoms.

NOCTUA GILVAGO, of Haworth (Wood, pl. 15, fig. 347), is considered by Mr. Stephens as a probable variety of the preceding insect, with which it is taken occasionally in company, differing from it in being very much paler-coloured, and without the maculated fasciæ and cloudings, and in bearing a series of subapical brown dots, and a spot in the place of the posterior stigma. Mr. Stephens also doubts whether it be the N. gilvago of Fabricius, which species is considered by the German and French Lepidopterists as quite distinct from fulvago, and as the gilvago is common near Paris, this opinion appears confirmed.

SPECIES 3.—XANTHIA AURAGO. PLATE XLV., FIG. 5.

SYNONYMES.—*Noctua aurago*, Wien. Verz.; Fabricius; Hübner; Haworth; Stephens; Wood, Ind. Ent., pl. 15, fig. 348; Boisduval; Guénée; Doubleday.

Noctua prætexta, Esper.
Noctua fucata, Esper.
Noctua rutilago, Borkhausen (variety).

This species measures $1\frac{1}{3}$ to $1\frac{5}{12}$ inch in the expanse of the fore wings, which are varied with reddish-brown, reddish-orange, and yellow colours, and but little clouded, the four ordinary fasciæ being represented by so many narrow yellow bars, of which that preceding the stigmata forms the trilobed margin of the dusky space between it and the first striga, whilst that beyond the stigmata is very much angulated, and followed by a darker colour, through which runs the spotted waved subapical striga, dilated at the apex of the costa; the characteristic portion of the wing is orange-red or bright orange, which is also the colour of the stigmata, the anterior of which is subannular and the outer one marked at the base with a red cloud. The hind wings are pale yellowish-red, with a darker border. The caterpillar is grey, with oblique brown marks. It feeds on sallow and willow. The moth appears from August to October.

SPECIES 4.—XANTHIA CITRAGO. PLATE XLV., FIG. 7, 8.

SYNONYME.—*Phalæna Noctua citrago*, Linnæus; Hübner; Haworth; Treitschke; Boisduval; Stephens; Wood, Ind. Ent., pl. 15, fig. 350; Wilkes, pl. 8 (larva).

This species measures from $1\frac{1}{3}$ to $1\frac{1}{2}$ inch in the expanse of the fore wings, which are of a clay-yellow colour, thickly irrorated with red scales, with four slender dark oblique strigæ crossing the wings, two preceding the stigmata, the third running between the stigmata, the fourth behind the outer stigma; there is likewise a subapical but almost indistinct striga formed of pale lunules bordered with darker lines; the stigmata are large, but chiefly indicated by their dusky outline; the hind wings are whitish clay-coloured. The caterpillar is reddish-brown, with pale longitudinal lines, and dotted with white, each segment having two oblong black spots on each side. It feeds on the lime, and the moth appears in August and September. It is an uncommon species. The larvæ were often taken by Mr. Blunt, in Epping Forest, near Walthamstow.

SPECIES 5.—XANTHIA CENTRAGO. PLATE XLV., FIG. 6.

SYNONYMES.—*Noctua centrago*, Haworth; Curtis, Brit. Ent., pl. 84; Stephens; Wood, Ind. Ent., pl. 15, fig. 349.

Noctua xerampelina, Hübner (nec Esper); Boisduval.
Cirrædia xerampelina, Guénée; Doubleday.

This very distinct species measures $1\frac{1}{3}$ to $1\frac{5}{12}$ inch in the expanse of the fore wings, which are of a rich orange colour, with several minute black lines on the costa; the characteristic portion of the wing is occupied by a red-brown bar, broadest towards the costa, where it becomes obsolete, terminating in a rounded lobe in the space ordinarily occurring between the stigmata, which are obsolete. The apical margin is also occupied by a bar of the same colour, which does not extend to the costa. The apex itself is acute, and the apical margin crenated, with the middle rather angulated; the hind wings are pale whitish, with slight reddish-yellow margins. This very rare species is widely dispersed, having been taken in the north of England, Norfolk, Dorsetshire, etc. The caterpillar, as described by M. Daube, in the Iconographie des Chenilles, is cylindric, rather short, with a small subglobose head, and with the extremities of the body slightly setose. It feeds on low plants. It is on account of the differences in the form of the wings, palpi, markings, etc., of the perfect insect as well as in the larva state, that M. Guénée has formed this insect into a distinct genus under the name of Cirrædia, which he places between Xanthia and our Cosmiæ (Euperiæ, Guén.)

Obs.—Xanthia fimbriago, Steph. (Wood, pl. 15, 351), is omitted, as we are informed by Mr. Doubleday that it is an American species.

XANTHOLEUCA, Stephens. IODIA, Hübner. LAMPETIA, Curtis. HOPORINA, Boisduval.

The Noctua croceago having been considered by several recent Lepidopterists as the type of a group distinct from the other Xanthiæ, it is here adopted with the name given to it by Mr. Stephens in the Appendix to the third volume of his Illustrations, an act of justice to that gentleman, who sufficiently pointed out its structural distinctions in p. 36 of the same volume; whilst the name Lampetia, subsequently given to it by Mr. Curtis (Entomol. Mag., i. 189), is rejected, having been twice previously used. Notwithstanding this recognition of the genus in this country ten years ago, it is not creditable to the researches of our continental neighbours to find it in 1840 again proposed as a new genus with a new name. Its chief characters consist in its elongated palpi, forming a kind of beak; its subconically crested thorax, its very flattened abdomen, decumbent wings truncated along the apical margin, with the tip acute, and caterpillar glabrous, scutellated, feeding on the leaves of trees, and marked with dark oblique lines. In several of these respects it forms a close approximation to the genus Glæa (Cerastis, Guén.)

SPECIES 1.—XANTHOLEUCA CROCEAGO. Plate XLV., Fig. 9, 10.

Synonyms.—*Noctua croceago*, Wien. Verz.; Fabricius; Albin, pl. 15, fig. 22, *e—h*; Hübner; Haworth; Treitschke; Stephens; Wood, Ind. Ent., pl. 16, fig. 352.
Noctua fulvago, Esper.
Noctua aurantiago, Donovan, 5, pl. 150, fig. 2, 3.

This species varies from 1 to 1⅓ inch in the expanse of the fore wings, which are of an orange or yellowish-red colour, with strigæ and spottings of brown; the costa of the fore wings marked with six distinct, white, nearly equidistant spots; the two basal strigæ are almost obsolete; the portion of the wing bearing the stigmata is dark; the stigmata large and concolorous; a distinct brown oblique striga running from the hinder part of the outer stigma to the inner margin of the wing; beyond the outer stigma is a curved row of dark dots, and the apical margin of the wing is dark-coloured, bearing an undulated, somewhat indistinct, subapical striga; the hind wings are whitish, with a dusky spot and central striga, often tinged with rosy, but which is, however, often obsolete. Varieties occur in the intensity of the ground-colour of the fore wings, and in the depth and extent of their markings.

The caterpillar is yellowish, coloured with white dots and angulated dark markings along the back, and oblique ones on the sides. It feeds on the oak. The moth is produced in the autumn, and appears to survive the winter, having been taken in February and April. It is not a very rare species in oak woods in the south of England.

ORBONA (ORBONA and SIDERIDIS p.), Hübner.

This group, which Boisduval forms into a section of Xanthia, is considered by Mr. Stephens as intermediate between Xanthia and Gortyna, but not strictly referable to either; differing from the true Xanthia in the acuteness and general form of the fore wings, and the elongation of the abdomen; from Gortyna by the larvæ not being radicivorous, and from both by having the thorax scarcely crested.

SPECIES 1.—ORBONA RUFINA. Plate XLV., Fig. 11, 12.

Synonyms.—*Phalæna Bombyx rufina*, Linnæus; Fabricius; Hübner; Treitschke; Stephens; Wood, Ind. Ent., pl. 15, fig. 376.
Noctua catænata, Esper.
Noctua punica, Borkhausen.
Phalæna Noctua nelvola, Linn., F. Su.; Haworth; Curtis.

This species measures from 1½ to 1⅔ inch in the expanse of the fore wings, which are of a brownish-red colour, with two fasciæ, and a striga of a darker shade; one of these fasciæ is basal and waved, representing the second striga (the basal one being almost obsolete). The stigmata are very pale and inconspicuous; the outer one

bearing an angulated striga between it and the preceding stigma. This is followed by a curved pale line, broadly edged externally with brown; and between it and the apical margin is a scarcely distinct, pale, waved subapical striga. The hind wings are brown, with the costa broadly flavescent; and the posterior margin and ciliæ of red. The caterpillar is reddish-brown, spotted with white, and with a white slender line on each side. It feeds on the oak; and the perfect insect appears in September and October, frequenting the flowers of the ivy. It is not of rare occurrence, and is found in most of the woods round London, Hertford, etc.

SPECIES 2.—ORBONA FERRUGINEA. PLATE XLV., FIG. 13.

SYNONYMES.—*Xanthia ferruginea*, Hübner; Treitschke; Duponchel; Boisduval; Stephens, Ill. 3, p. 68. | *Noctua macilenta*, Haworth; Stephens; Wood, Ind. Ent., pl. 10, fig. 186. (Orthosia m.)

This species measures from $1\frac{1}{3}$ to $1\frac{2}{3}$ inch in the expanse of the fore wings, which are of a testaceous or reddish colour, with four darker strigæ, and a brown spot at the base of the outer stigma. The male antennæ are slightly pectinated. The head, thorax, and fore wings testaceous or brick-red, with obsolete strigæ; the first at the base, sometimes evanescent; the second flexuose, preceding, and the third formed of evanescent arches beyond the stigmata; and the fourth near the tip slightly undulated and more distinct than the rest, and rufescent, rather indistinctly margined with paler colour. The two ordinary stigmata are distinguishable only by their margins, except that the outer one has a dusky spot at the base. A rather dusky striga, broader than the others, passes in some specimens between the stigmata from the costa to the hind margin of the wing. The hind wings are brown, with a dusky central lunule. The costal margin broadly whitish, and the ciliæ rufous. The caterpillar is reddish-brown, with dusky spots, with whitish stripes on the back and sides. It feeds on the oak and elm; and the moth appears in September, frequenting places where the elm abounds. It is a rare species, but occurs in various localities, Combe Wood, New Forest, Huntingdonshire, etc.

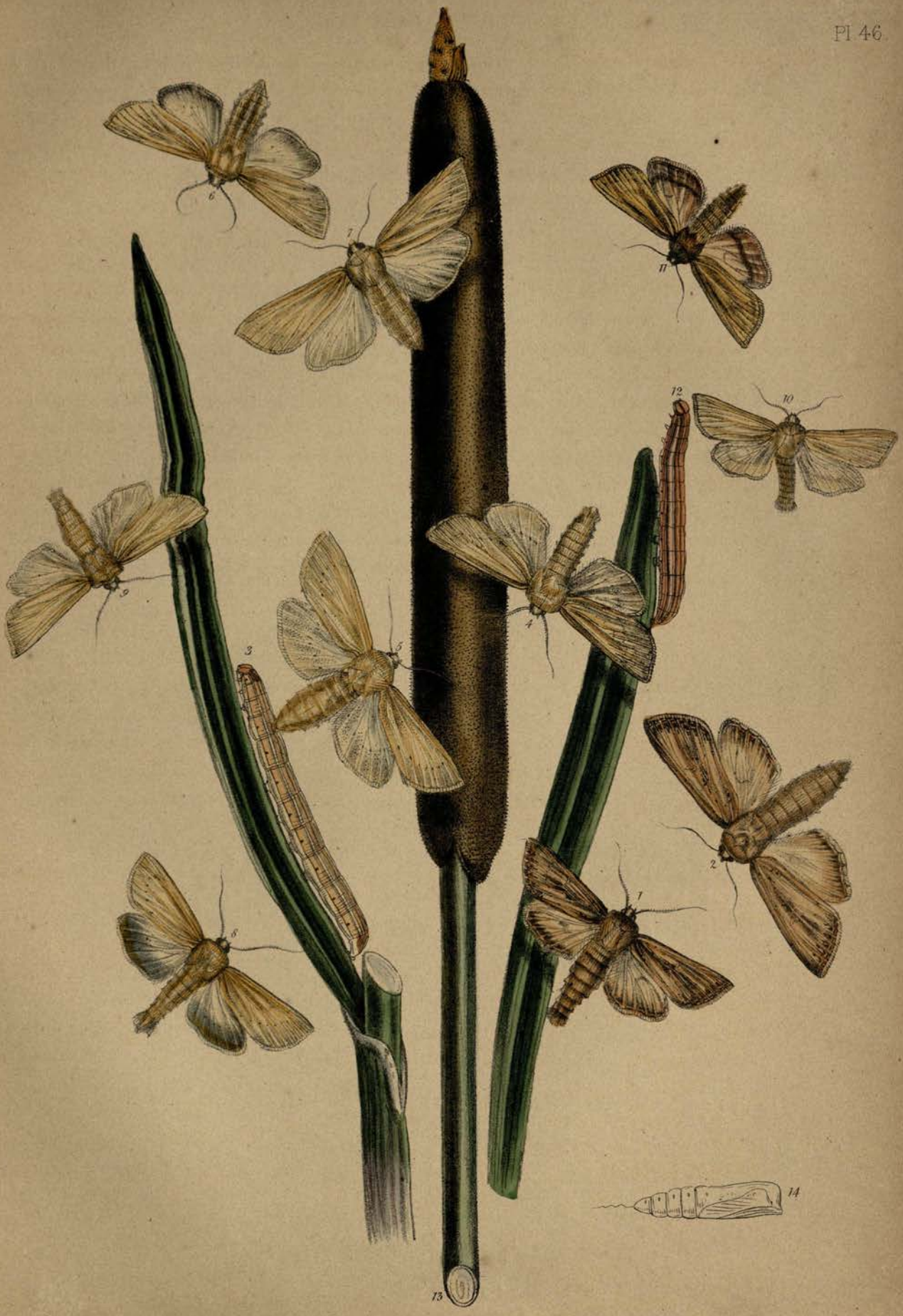
GORTYNA, OCHSENHEIMER. (GORTYNA AND HYDRÆCIA, P. GUEN.)

This genus is characterised by the setaceous antennæ, short palpi, long conical abdomen, wings forming a triangle when at rest, with the sides slightly deflexed, and the disk marked with strong characters. The thorax is slightly crested. The larvæ are cylindric fleshy grubs, with the first segment scutellated, and the others furnished with small black piliferous tubercles; they are internal feeders, residing in the stems or roots of plants.

SPECIES 1.—GORTYNA MICACEA. PLATE XLV., FIG. 14, 15.

SYNONYMES.—*Noctua micacea*, Esper; Treitschke; Curtis, Brit. Ent., pl. 252; Stephens; Wood, Ind. Ent., pl. 15, fig. 353; Duponchel; Freyer. *Noctua cypriaca*, Hübner; Haworth.

This species measures from $1\frac{1}{4}$ to rather more than $1\frac{1}{3}$ inch in the expanse of the fore wings, which are of a rosy-brown colour; towards the base of the wing are two slight dusky strigæ, the first abbreviated, and the second waved. The characteristic portion of the wing forms a very broad dark fascia (narrowed behind), on which are placed the stigmata, which are concolorous, with dark edges. The third striga forms a strong, nearly straight, edge to the fascia, followed outwardly by a broad paler streak, through which runs a very indistinct subapical striga. The hind wings are pale ochre-coloured, with the ciliæ darker. The veins and a slender striga across the wing, beyond the middle, dusky. The markings, as well as the ground-colour of the wings, vary in intensity of tint. The caterpillar is fleshy-coloured, with a brown head, and scutellated first segment; the body minutely dotted with black, and with a dusky line down the back, and the head red. It feeds on the roots of Cyperaceæ; and the moth appears in July and August. It is not a rare species, frequenting the sides of ditches in various distant parts of the country.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SPECIES 2.—GORTYNA FLAVAGO. PLATE XLV., FIG. 16, 17.

SYNONYMES.—*Noctua flavago*, Wien. Verz.; Hübner; Treitschke; Stephens; Wood, Ind. Ent., pl. 15, fig. 354.
Phalæna Noctua Lappæ, Donovan, 10, pl. 340.
Noctua ochraceago, Haworth; Harris; Aurelian, pl. 35, fig. *a*—*e*; Duncan, Brit. Moths, pl. 24, fig. 2.
Noctua rutilago, Fabricius.

This elegant species measures from $1\frac{1}{8}$ to more than $1\frac{1}{2}$ inch in the expanse of the fore wings, which are of a rich orange-yellow, beautifully mottled with red-brown scales and purplish-brown markings. At the base of the wing is a trilobed yellow patch, followed by a purplish-brown bar, succeeded by the characteristic part of the wing which bears the three stigmata; the inner one small, round, and pale yellowish-buff; the outer one larger and ear-shaped, mottled with red scales within; the supplemental one semi-oval, all being surrounded by slender reddish-brown lines. Beyond the stigmata is a curved catenated series of yellow arched dots, followed by a purplish bar, which is succeeded by the much waved, almost obsolete, subapical striga, formed of fulvous arches. The cilia purplish-brown; the hind wings pale brown, with a slender striga beyond the middle, and a broadish subapical fimbria.

The caterpillar is dirty flesh-coloured, dotted with black setigerous tubercles. The scutellation on the segment behind the head, and the terminal segment of the body, black. It feeds within the stems of various aquatic or subaquatic plants, such as the burdock, Scrophularia, etc. The moth appears in August and September. It is a rather common and widely-dispersed species.

DESCRIPTION OF PLATE XLVI.

INSECTS.—Fig. 1. Nonagria Typhæ (the bulrush moth). 2. A female. 3. The caterpillar.
„ Fig. 4. Nonagria Pilicornis (the large wainscot). 5. A female.
„ Fig. 6. A variety called Crassicornis. 7. A female.
„ Fig. 8. A variety with dark under wings.
„ Fig. 9. A variety resembling the N. Lutosa of Hübner.
„ Fig. 10. A variety called Cannæ.
„ Fig. 11. The continental Cannæ.
„ Fig. 12. The caterpillar of Cannæ.

The two figures of the distinct species N. Typhæ are from specimens sent me by Mr. H. Doubleday. The continental N. Cannæ is from a German specimen in the British Museum. All the others, which it is now generally admitted are but varieties of one species, are from fine fresh specimens recently taken by Mr. S. Stevens, at Hammersmith. The caterpillar of Typhæ is from Freyer; that of Cannæ from Hübner. H. N. H.

NONAGRIA, OCHSENHEIMER.

This genus is distinguished by having the antennæ slightly crenulated and strongly ciliated in the males, but merely pubescent in the females; the palpi are bent upwards, rather small, and with the terminal joint minute. The thorax is not regularly crested; the fore wings deflexed when at rest, elongate trigonate, with the tip acute. The body is elongated; the larvæ are also long and naked, with a small head, and with the body marked with pale longitudinal streaks, and the anterior and posterior segments scutellated. They live concealed within the stems of Gramineous and Cyperaceous plants; within which they also undergo their transformations. The indigenous species of this genus appears to require a minute revision, as the recent captures of Mr. S. Stevens have shown that one species, at least, is subject to remarkable variation. This genus is so closely allied to Leucania, that authors are by no means agreed in the generic position of various species, as will be noticed in the synonymes of the different insects. It is only by a more perfect knowledge of their preparatory states that we can hope to determine this question satisfactorily.

SPECIES 1.—NONAGRIA TYPHÆ. Plate XLVI., Fig. 1, 2, 3.

Synonymes.—*Noctua Typhæ*, Hübner; Esper; Borkhausen; Treitschke; Haworth; Stephens; Wood, Ind. Ent., pl. 15, fig. 355.
Noctua arundinis, Fabricius.
Noctua nervosa, Esper (variety?).
Noctua fraterna, Borkhausen (variety?).

This may be considered as the type of the genus Nonagria; it varies from 1¾ to 2 inches in the expanse of the fore wings, which are of a pale reddish-buff colour, the veins forming delicate white lines, margined on each side, more or less strongly, especially beyond the middle of the wing and along the great median vein, with brown; the principal veins are dotted with black towards the base of the wing, and the two ordinary stigmata are slightly indicated in fine specimens by some slight fuscous markings; parallel to the apical margin of the wing there runs a row of small black lanceolated spots, preceded by a curved row of very minute brown ones placed on the veins. The apical margin has a row of small black semilunar dots. The hind wings are paler, and very glossy, the margin rather darker, and an interrupted dark marginal line.

"The larva is a most singular one; it is very elongate and slender, of a dirty brown colour, longitudinally striped up the back and sides with darker lines; it does not confine itself to an upright position, as Duponchel observes, and Mr. Curtis repeats, but enters the stem of the Typha usually about eight inches above the water, and continues to devour the lateral portion to the water's edge; it then comes out and attacks another and another." (Ent. Mag., i. 455) "It eats downwards, just in the centre, until it reaches nearly to the root, often some inches below the water; it then turns round and proceeds upwards, enlarging its old track, and by the time it has arrived a few inches above the water it is full-grown. It there gnaws quite through the outside of the stem, closing the opening with a slight web of silk. It then spins a web, intermingling with the silk a large proportion of the fibres of the bulrush, which it has gnawed off, always undergoing the metamorphosis head downwards, and suspended within the web by a thread about two lines long, with a small cup-shaped termination, which invests the last segment of the body of the pupa. They remain about three or four weeks in the pupa." (Delta, in Entom. Mag., i. 441, and ii. 452.) The moth is by no means of rare occurrence where the bulrush grows, and Mr. S. Stevens has taken it from the end of July to the middle of September.

SPECIES 2.—NONAGRIA CRASSICORNIS. Plate XLVI., Fig. 4—10.

Synonymes.—*Noctua crassicornis*, Haworth; Curtis; Stephens; Wood, Ind. Ent., pl. 15, fig. 357.
Noctua pilicornis, Haworth, in Trans. Ent. Soc., Old Series, p. 336; Steph., Ill. H. 3, pl. 20. fig. 1; Wood, Ind. Ent., pl. 15, fig. 356 (male).
Noctua lutosa, Hübner; Curtis; Stephens; Wood, Ind. Ent., pl. 52, fig. 1668 (variety).
Nonagria cannæ, Stephens; Wood, Ind. Ent., pl. 15, fig. 358 [Treitschke?].
Noctua algæ, Esper?
Noctua arundinis, Hübner?
Leucania Bathyerga, Freyer?*

The fine series of Nonagriæ and Leucaniæ, captured by Mr. Stevens during the past season within a mile of my residence, has enabled us to speak with tolerable certainty respecting some, at least, of the supposed species of these insects, and more especially, in the present instance, when several species are thus proved to be but varieties of a very variable insect. The expanse of the fore wings varies from 1⅔ to nearly 2 inches. They are of a pale reddish-buff colour, slightly irrorated with dusky scales, especially along the median vein, and on each side of the veins towards the apex of the wings; beyond the middle of the wings is a curved row of dark dots placed on the veins, which likewise extends across the hind wings, which are whitish in the females, but dusky white in the males: the antennæ, in the latter sex, are strongly pilose. The ciliæ are pale lutescent. Mr. Stephens, in his

* Mr. E. Doubleday having sent specimens of the N. crassicornis to Paris, has been informed by M. Pierret that they are identical with Leucania Bathyerga, *Freyer*. As, however, Boisduval gives N. Vectis, of Curtis, as a synonyme of that species, I have added a mark of doubt to the quotation.

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Illustrations, describes the female (Crassicornis) as more thickly irrorated with fuscous than the male (Pilicornis); but this is not the constant character of the sexes. He also suggested the possibility of these two supposed species being but the sexes of one. Our figures 4 and 5 represent a splendid pair of this species, whilst figures 6 and 7 represent a variety of both sexes, of a paler colour, without so decided irrorations as in figures 4 and 5, and with the rows of dots almost obsolete. Our figure 8 represents another variety of the male, known by its more elongated abdomen, tufted at the extremity, which has the hind wings dark-coloured, except at the base. Our figure 9 represents a specimen which resembles the Noctua lutosa of Hübner (which, by the way, is not admitted as a species by the French entomologists), and which is almost entirely of a pale luteous-buff colour, with the dots and irrorations obsolete: it is smaller than the specimens above mentioned; whilst figure 10 is a small variety which has been considered as the N. Cannæ;* a comparison, however, with the much more brightly-coloured figure of the true Cannæ will show the great difference between them.

Until the past year these insects have been rare in collections: one or two specimens of Pilicornis from the neighbourhood of Croydon; the same number of Crassicornis from Norfolk, and also the same number of the supposed Cannæ† from Yorkshire; and a single specimen of the supposed Lutosa from Derbyshire. Mr. Samuel Stevens has been so kind as to favour me with the following notice of his captures of the species in marshy ground, to the north of the Hammersmith road, opposite to Lord Holland's chapel:—"I captured this fine species, from the end of August till the beginning of November, settled on the flowers of the reeds from six till ten o'clock in the evening, and succeeded in taking nearly seventy specimens by nightly visiting the spot. N. pilicornis is the male. I have a specimen or two which agree tolerably well with the Lutosa of Hübner, although these have faint indications of dots. I hope next season to breed them from the egg; they are, I believe, internal feeders, as I have taken a few young caterpillars lately in the interior of the reeds, that doubtless belong to this species." The caterpillar, represented in figure 12 as that of Cannæ is from Hübner, and is very similar to that of Typhæ, except in being of a redder-brown, with pale lines. The artist has probably omitted the scutellations of the fore and hind part of the body, seen in figure 3.

DESCRIPTION OF PLATE XLVII.

INSECTS.—Fig. 1. Leucania straminea (the southern wainscot).
" Fig. 2. Leucania comina (the shoulder-stripe wainscot).
" Fig. 3. Leucania impura (the smoky wainscot). 4. The Caterpillar.
" Fig. 5. Leucania obsoleta (the obscure wainscot).
" Fig. 6. Leucania littoralis (the shore wainscot).
" Fig. 7. Leucania pallens (the common wainscot).
" Fig. 8. Leucania suffusa (a variety of pallens).
" Fig. 9. Leucania pygmina (the small wainscot).
" Fig. 10. Leucania pallida (a variety of pygmina).
" Fig. 11. Leucania gemini puncta (the twin spotted wainscot). 12. The Caterpillar.
" Fig. 13. Leucania pudorina (the striped wainscot). 14. The Caterpillar.
" Fig. 16. Leucania phragmatidis (the Simyra musculosa of some British collections).

PLANT.—Fig. 15. Eriophorum angustifolium (narrow-leaved Cotton-grass).

The whole of the insects in this plate are selected from the fine series of specimens in the possession of Mr. Stevens, with the exception

* The following is Mr. Stephens's description of N. Cannæ:—Expans. alar. 1⅛ unc. Head and thorax pale reddish or yellowish-ash, anterior wings the same, with a few minute dusky atoms, with some larger spots at the base, and a row, still more distinct, towards the hinder margin, and forming an arcuated striga; in the middle of the disk is a single spot of similar hue; posterior wings reddish or yellowish-ash.

† Wood's figure of Cannæ, from Mr. Bentley's Scarborough specimen, has the fore wings without dots, and the hind ones dark brownish-grey. Mr. H. Doubleday, however, informs me that Mr. Bentley, on seeing the true continental Cannæ, was convinced that his insect was not that species.

of littoralis, pudorina, and phragmatidis, from the cabinet of Mr. I. F. Stephens, comma from Mr. H. Doubleday, and obsoleta from the British Museum. In some varieties I have thought it unnecessary to figure such as arcuata, a variety of impura, ochracea, another variety of pallens, and fulva, another variety of pygmina. Unipuncta, some time since considered British, is proved to be a North American species, having accidentally obtained a place in some old cabinets. The caterpillars are from Hübner and Freyer; that of impura accords with some specimens obtained in the Hammersmith marshes by Mr. S. Stevens. H. N. H.

LEUCANIA, Ochsenheimer. LEUCANIA and NONAGRIA pars, Guénée.

This genus is closely allied to Nonagria, in which group, indeed, the French Lepidopterists introduce some of the following species. The typical Leucaniæ are, however, distinguished by their small size, the antennæ nearly alike in both sexes; scaly above, and thickly ciliated beneath; the thorax is not crested, the abdomen long and slender in the males, the fore wings narrow and acute at the tip. The caterpillars are described by Stephens as not being internal feeders, slightly pilose, and feeding on leaves, and the pupa is enclosed in a web, according to Ochsenheimer. How far the latter characters will apply to all the following species is doubtful, since our figures 4, 12, and 14 evidently represent two different types of larvæ.

SPECIES 1.—LEUCANIA STRAMINEA. Plate XLVII., Fig. 1.

Synonymes.—*Leucania Straminea*, Treitschke; Boisduval; Freyer. | *Nonagria Vectis*, Curtis, Brit. Ent., pl. 459; Stephens; Wood, Ind. Ent., pl. 52, fig. 1669.

This species measures 1½ inch in the expanse of the fore wings, which are alternately marked with numerous longitudinal ochreous and cream-coloured lines, the nervures being pale; the central nervure suffused with reddish ochre, as well as the one next the interior margin, which is slightly freckled with black; at the disk is a fuscous dot, and an imperfect curved line of similar dots, between it and the posterior margin, which bears seven black dots, the posterior angle emarginate; hind wings white, lightly tinted with ochre, and freckled with brown below the centre, where there is a pale spot shining through from beneath. The obscure line of fuscous dots is continued across their wings; they are somewhat oval, and there are a few dark dots on the margin. (Curtis, Brit. Ent., 459.) Taken in the Isle of Wight and at Whittlesea Mere in July, also in the Hammersmith marshes in June, by Mr. S. Stevens—in company with Leucania obsoleta.

SPECIES 2.—LEUCANIA COMMA. Plate XLVII., Fig. 2.

Synonymes.—*Phalæna Noctua comma*, Linnæus; Treitschke; Haworth; Stephens; Wood, Ind. Ent., pl. 15, fig. 359.
Noctua pallens, Esper.
Noctua turbida, Hübner (teste Stephens).
Noctua congrua, Hübner?
Noctua impura, Hübner (teste Boisduval).

This species measures nearly 1½ inch in the expanse of the fore wings, which are of a pale ashy-brown, with a black central line at the base, extending behind the median vein, as far as its first branch; a similar but shorter and slenderer line extends behind each of the longitudinal branches, beyond the middle of the wing; the costa is paler luteous brown; the disk darker brown; the veins whitish, with a slender margin of pale brown on each side. At the extremity of the discoidal cell is a black dot; the apical margin of the wing has a row of minute black dots, between which extend the white veins into the ciliæ; the hind wings are of a shining grey-brown, with pale ciliæ; the thorax has a slender dark arch in front.

The caterpillar is naked, reddish-brown, dotted and striped with black on the back; the first segment scutellated with black, with three white lines; it feeds on the common sorrel. The moth is rather abundant, and appears in June and July.

SPECIES 3.—LEUCANIA IMPURA. Plate XLVII., Fig. 3, 4.

Synonymes.—*Noctua impura*, Hübner; Treitschke; Stephens; Wood; Ind. Ent., pl. 15, fig. 362; Albin, pl. 33, fig. 53, e—h.
Noctua fuliginosa, Haworth.
Noctua punctina, Haworth; Stephens; Wood, Ind. Ent., pl. 15, fig. 363 (variety).
Leucania arcuata, Steph.; Wood, Ind. Ent., pl. 15, fig. 364 (var.?).

This species measures from 1½ to nearly 1½ inch in the expanse of the fore wings, which are of a luteous

ochre, slightly tinged with red; a pale line running through the middle, from the base to the apical margin. All the veins are slender and white, with the space between the veins beyond the middle of the wing longitudinally striated with pale and darker brown lineolæ, three dark lines being placed between each pair of veins. At the extremity of the discoidal cell is an exceedingly minute black speck; and between this and the apical margin is a curved row of minute blackish dots, two of which are larger than the rest; the hind wings are brownish-grey, and shining, with white ciliæ. The caterpillar is buff, with pale dorsal and lateral lines; it feeds on various species of Carex, and the moth appears in July, and is very abundant.

NOCTUA PUNCTINA, Haworth, has the wings striolated and entirely rufescent; the fore wings, with the apical margin, dotted with brown; the hind wings pale, with a broad ashy patch at the anal angle. It occurs in company with the type of the species, as does also

LEUCANIA ARCUATA, Stephens, which has the fore wings pale straw-coloured, with two black dots on the disk; apical margin immaculate; the posterior wings white, shaded with ashy-brown, and with an arched row of brown spots* beyond the middle of the wing, each spot placed upon a vein; cilia white. This may possibly be a variety of L. pallens.

SPECIES 4.—LEUCANIA OBSOLETA. PLATE XLVII., FIG. 5.

SYNONYMES.—*Noctua obsoleta*, Hübner; Treitschke; Stephens; Boisduval; Guénée; Wood, Ind. Ent., pl. 15, fig. 361.
Noctua fuliginosa, Haworth (teste Curtis).

This species measures about 1½ inch in the expansion of the fore wings, which are of a dirty buff colour, caused by numerous minute dusky irrorations; the veins are pale, especially the great median one, with a delicate dusky line on each side; the discoidal cell bears two such lines, and between the veins in the apical portion of the wings there is a series of more distinct dusky longitudinal lines, which terminate in minute dark dots; at the branching off of the third branch of the median vein there is a more distinct white dot, beyond which is an oblong row of dusky dots, one being placed on each vein. The hind wings are white, with a dusky margin and veins, and a small central dark dot. Taken by Mr. Samuel Stevens, in the Hammersmith Marshes, in June last. Mr. Douglas, we are also informed, has taken it in the Bermondsey Marshes, and Mr. Chant, near the City-road.

SPECIES 5.—LEUCANIA LITORALIS. PLATE XLVII., FIG. 6.

SYNONYMES.—*Leucania litoralis*, Curtis, Brit., Ent. pl. 157. *Leucania littoralis*, Stephens; Wood, Ind. Ent., pl. 15, fig. 360.

"Pale and dull ochraceous; superior wings fuscous in the middle, with a white stripe down the centre, slightly produced midway at the nervure, and furcate towards the extremity; three small white stripes upon the nervures at the apex; and six fuscous lines between the nervures at the posterior margin; cilia fuscous; inferior wings white tinged with yellow; abdomen darkest towards the apex."—Curtis, op. cit. Varieties of a brownish tinge occur; and the dusky streaks between the nervures are variable in intensity. Taken on the coast near Christchurch, Hampshire, and on the coast in Cumberland.

SPECIES 6.—LEUCANIA PALLENS. PLATE XLVII., FIG. 7, 8.

SYNONYMES.—*Noctua pallens*, Linn.; Hübner; Haworth; Treitschke; Stephens; Wood, Ind. Ent., pl. 15, fig. 365.
Noctua rufescens, Haworth; Stephens; Wood, Ind. Ent., pl. 15, fig. 366 (a probable variety).
Noctua suffusa, Stephens; Wood, Ind. Ent., pl. 15, fig. 367 (a probable variety).
Noctua ochracea, Stephens; Wood, Ind. Ent., pl. 15, fig. 368 (a probable variety).

This variable insect measures about, or rather less than, 1½ inch in the expanse of the fore wings, which are of a reddish-buff colour; the veins rather paler than the disk of the wings; bordered on each side with a rather

* Wood's figure, from one of Mr. Stephens's specimens, does not exhibit this arched row of dots.

darker streak; and with a third rather darker longitudinal streak running between the two, bordering the veins at the apical portion of the wing; the disk is sometimes almost destitute of any dotting, but is generally marked beyond the middle with three small dark dots, placed in an open triangle; the apical margin is not marked with a row of small dots at the tips of the longitudinal streaks, with the veins slightly streaked with dusky, and the hind wings are pale buffish-white. This is a very abundant species, occurring throughout the kingdom in July. The caterpillar is dusky; with pale dots and four white longitudinal lines. It feeds on the sorrel and chickweed. We have followed the advice of Mr. H. Doubleday, in giving as varieties of L. pallens the three following insects, although L. suffusa appears to us to have the fore wings more regularly truncate at the extremity, and the apex more acute.

NOCTUA RUFESCENS, Haworth. Of a reddish colour, with the fore wings veined and without dark dots; the hind wings, except along the costa, in certain positions pale brown. It varies in having three or four dusky streaks on the fore wings, visible in certain positions; the hind wings very dusky, with brown veins.—Considered by Mr. Stephens as a probable variety of L. pallens.

LEUCANIA SUFFUSA, Stephens, and our plate 47, fig 8; with the fore wings reddish, streaked with whitish-ashy between the veins; with a single dusky dot at the apex of the discoidal cell, and two or three obsolete brownish streaks near the extremity; hind wings whitish, with a broad subapical dusky stripe; the apical margin paler. Taken near Limehouse, Ripley, and in Norfolk.

LEUCANIA OCHRACEA, Stephens; measures only thirteen lines in the expanse of the fore wings, which are "pale ochraceous, with a slight rufescent tinge in certain lights, and immaculate, obscurely striated with pale fuscous between the nervures, the striæ at the base and on the inner margin being the darkest, as in L. comma; hind wings whitish-ash, with the margin slightly darker."

The pubescent eyes, fore wings not irrorated with dusky scales, and pale hind wings, distinguish this from the following small species of the genus. Taken at Darenth Wood and Whittlesea Mere, in the autumn; whence Mr. H. Doubleday conjectures that this is the autumnal brood of L. pallens.

SPECIES 7.—LEUCANIA PUDORINA. PLATE XLVII., FIG. 13, 14.

SYNONYMES.—*Noctua pudorina*, Wien. Verz.; Hübner; Treitschke; Stephens; Wood, Ind., Ent., pl. 15, fig. 374 (male).
Noctua impudens, Hübner (female).

This species measures nearly 1⅜ inch in the expanse of the fore wings, which are of a pale reddish-brown colour; irrorated and longitudinally clouded with dusky scales; with one or two more distinct dusky lines towards the base of the wing, with others less distinct between the veins, which are buff towards the apical margin; hind wings grey-brown, with a reddish tinge towards the apical margin. Taken in the New Forest, and at Whittlesea Mere in June. The caterpillar is pale dirty buff, with a white longitudinal dorsal stripe, and a pale lateral one edged with dusky.

Obs.—The following species are not strictly referrible to the genus Leucania. Their naked eyes, acute palpi, and the habits of such of the larvæ as are known, prove them to be nearer in affinity to the genus Nonagria.

SPECIES 8.—LEUCANIA? PHRAGMATIDIS. PLATE XLVII., FIG. 16; and PLATE XLVIII., FIG. 1.

SYNONYMES.—*Noctua phragmatidis*, Hübner; but not *Leucania phragmatidis*, Steph. Catal.
Simyra musculosa, Stephens; Wood, Ind. Ent., pl. 15, fig. 375.
Noctua musculosa of Hübner; Treitschke; but not Duponchel, from which last-named author we have copied a figure of the continental musculosa in our pl. 48, fig. 2, in order to show the distinction between it and the English species supposed to be identical therewith.

This species measures about 1¼ inch in the expanse of the fore wings, which are ochre-coloured, with a greenish-brown tinge, very glossy and unspotted; the veins pale-coloured and slightly greenish; the apical

portion of the wing darker coloured than the base; the hind wings brownish, with the base and veins paler. The palpi are very acute. Taken in the fens of Huntingdonshire and Cambridgeshire.

SPECIES 9.—LEUCANIA? GEMINIPUNCTA. PLATE XLVII., FIG. 11, 12.

SYNONYMES.—*Noctua geminipuncta*, Haworth; Stephens; Wood, Ind. Ent., pl. 15, fig. 373.

Noctua geminipunctata, Hatchett, in Trans. Ent. Soc., Old Series, p. 327, pl. 9, f. 2 (not 1, as cited in the description).

Nonagria paludicola, Hübner; Treitschke; Boisduval; (teste H. Doubleday in litt., by whom the species is omitted in his list of British Noctuæ.)

This species measures rather less than 1 inch in the expanse of the fore wings, which are of a reddish-brown, with a broad red vitta along the hinder margin, extending nearly to the anal angle; and two small white dots at the extremity of the discoidal cell, in the place of the posterior stigma. The hind wings are brown; the abdomen long and whitish, and the antennæ red. Taken on Hackney Marshes, by Mr. J. Hatchett, in August, 1796. Mr. S. Stevens took about a dozen specimens in the Hammersmith Marshes through the same month of last year, the female being rarest. The caterpillar is pale, minutely tuberculated, and setigerous, with a brown head and anal scale; thus differing considerably from the larvæ of Nonagria. It is an internal feeder; the larva feeding within the stems of Arundo Phragmites, as we learn from M. Guénée's excellent memoir, in the Annales de la Société Entomologique de France; and who gives the following summary of the differences between the habits of this larva and that of Nonagria Typhæ. 1st. This larva confines itself to a single reed, which is sufficient for its entire food. 2nd. It does not spin a web like that caterpillar, merely fastening the loose particles of the reed with threads together. 3rd. The chrysalis has the head directed upwards. 4th. It is not enclosed in a cocoon. 5th. The aperture by which the moth escapes is oval, and not circular. 6th. It forms a sort of trap-door over this aperture.

SPECIES 10.—LEUCANIA? PYGMINA. PLATE XLVII., FIG. 9.

SYNONYMES.—*Noctua pygmina*, Haworth; Stephens; Wood, Ind. Ent., pl. 15, fig. 370. *Leucania Phragmatidis*, Steph. Catal.

This species measures from $\frac{5}{6}$ to 1 inch in the expanse of the fore wings, which are reddish and unspotted, with very slight rudiments of dusky clouds on the costa, disk, and apical veins; the hind wings are brownish, with the costa paler, and ochre-coloured cilia, and the abdomen white, with the apex ochreous.

LEUCANIA PALLIDA, Stephens; Wood, Ind. Ent., pl. 15, f. 371; and our pl. 47, fig. 10, is given by Mr. Stephens as a probable variety of this species. It measures $\frac{3}{4}$ of an inch in the expanse of the fore wings, which are ochreous, whitish, and without any traces of spots or markings; the veins alone in the apical part of the wing irrorated with dusky scales, and the hind wings whitish. Taken in the marshes near West Ham, Essex; also at Camberwell, on the 15th September, by Mr. Douglas.

Obs.—That Wood's figure represents the fore wings very much broader than those of the allied insects.

LEUCANIA FLUXA, Hübner; Stephens; Wood, Ind. Ent., pl. 15, f. 369 (L. fulva, Hübner), may possibly be another variety of the same species; measuring an inch or rather more in the expanse of the fore wings, which are of a reddish-brown colour, slightly irrorated with dusky scales; the veins dusky, as well as several more or less distinct longitudinal lines. The apical margin with an indistinct row of minute dots; the hind wings brown, with the base and costa ashy. Taken at Whittlesea Mere, at the end of July, and by Mr. Douglas, on Clapham Common, on the 15th September.

Other individuals, which have been doubtingly regarded by Mr. Stephens as the NOCTUA NEURICA of Hübner (and Wood, Ind. Ent., pl. 15, f. 372), are about $\frac{5}{6}$ of an inch in the expanse of the fore wings, which are ochreous, or brownish-red, with a curved row of minute dusky dots beyond the middle of the wing; the apical veins slightly brownish, and the hind wings pale whitish-ash. Taken, but very rarely, in the marshes near Lea Bridge and at Whittlesea Mere.

DESCRIPTION OF PLATE XLVIII.

INSECTS.—Fig. 1. Simyra musculosa of some collections (properly Leucania Phragmatidis). See Plate XLVII., fig. 16.
" Fig. 2. Leucania musculosa of the Continent.
" Fig. 3. Simyra nervosa (the tawny-veined wainscot).
" Fig. 4. Simyra venosa (the powdered wainscot).
" Fig. 5. Phlogophora meticulosa (the angle-shades). 6. The Caterpillar.
" Fig. 7. Cucullia verbasci (the Mullein). 8. The Caterpillar.
" Fig. 9. Cucullia scrophulariæ (the water betony). 10. The Caterpillar.
" Fig. 11. Cucullia Thapsiphaga (the shepherd's purse). 12. The Caterpillar.
" Fig. 13. Cucullia Lychnitis. 14. The Caterpillar.
" Fig. 15. Cucullia Prenanthis.

PLANT.—Fig. 16. Verbascum pulverulentum (the powdered mullein).

Simyra venosa is from a continental specimen, in which the characters are much better defined than in any British specimens I have, which may perhaps not be the true venosa; the musculosa of the Continent is from Duponchel's figure.

As there is some confusion in British cabinets respecting the species of Cucullia here figured, I have had recourse to Rambur's plate in the Transactions of the French Entomological Society, in which each species is carefully figured with its larva, all from specimens reared by himself. The common Verbasci, however, is from a specimen in the cabinet of Mr. Bentley, and the Lychnitis from a small continental specimen, which perfectly agrees with Rambur's figure, except in size, in which it seems to vary much, some specimens being even larger than Verbasci. The distinctions in the first four species, though slight, seem constant and tolerably well defined, whilst in the larva state it will be seen that they are more distinct, Thapsiphaga being quite differently marked; that of Verbasci is more powdered with the smaller black spots, and in Lychnitis the ground is more yellowish, while the deep yellow markings form a continuous stripe through the black spots, not being separated as in Scrophulariæ.

Prenanthis (Blattariæ, *Dup.*) is from Duponchel's figure, and accords very closely with two dark specimens in Mr. Stephens's cabinet, which are certainly distinct from the former species. H. N. H.

SIMYRA, OCHSENHEIMER.

This genus has the fore wings sublanceolate, and very acute at the tip, and destitute of the ordinary stigmatic markings; the palpi moderately acute and parallel; the antennæ simple in both sexes; those of the males stout and pubescent beneath; the thorax rounded. The caterpillars are pilose, somewhat resembling those of the genus Acronycta, and more or less clothed with hispid tubercles. They feed on herbaceous plants. The pupæ are enclosed in a cocoon.

SPECIES 1.—SIMYRA VENOSA. PLATE XLVIII., FIG. 3.

SYNONYMES.—*Noctua venosa*, Borkhausen; Treitschke; Stephens; Wood, Ind. Ent., pl. 16, fig. 395. *Noctua degener*, Hübner. *Noctua atomina*, Haworth.

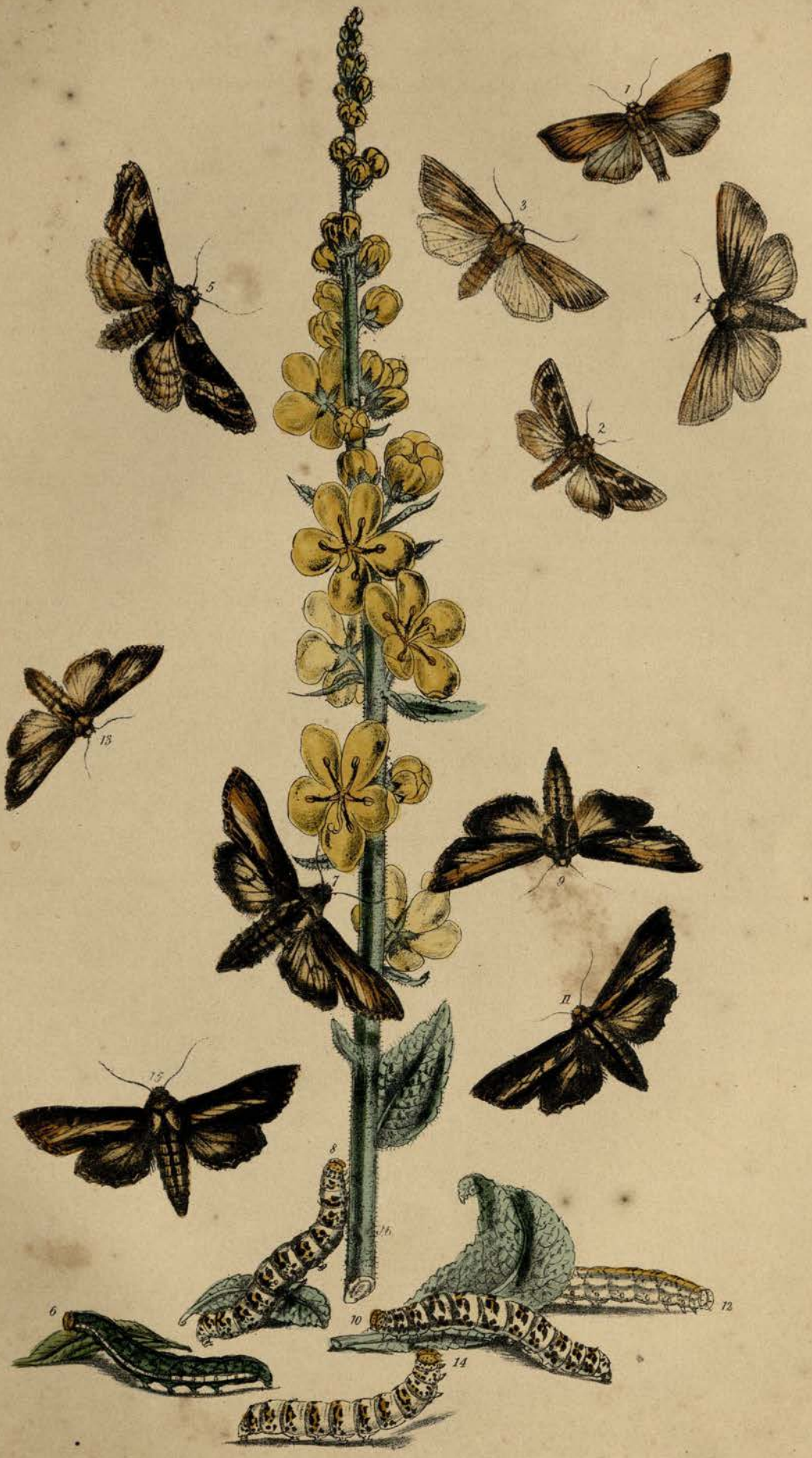
This species measures rather more than 1½ inch in the expanse of the fore wings, which are of a hoary white, or buff colour, thickly irrorated (as well as the thorax) with minute dusky atoms, which are scarcely visible to the naked eye; with several long, slender, brownish streaks, visible more or less clearly in certain positions, and in different specimens; the hind wings and abdomen are white and spotless.

The caterpillar is thick and clothed with fascicles of erect hairs; yellowish on the upper side of the body, with spots and dots of red, brown, and black; and with a yellow lateral stripe, which is interrupted by brown spots; on the under side of the body it is rufescent, with the fore legs and head spotted with black. It feeds on a species of Carex, at the end of July, and the moth appears in the following June. It is found in marshy places, especially the fens of Huntingdonshire.

SPECIES 2.—SIMYRA NERVOSA. PLATE XLVIII., FIG. 4.

SYNONYMES.—*Noctua nervosa*, Wien. Verz.; Fabr.; Hübner; Treitschke; Haworth; Stephens; Wood, Ind. Ent., pl. 16, fig. 412. *Noctua oxyptera*, Esper.

This species measures about 1¼ inch in the expanse of the fore wings, which are sublanceolate, pale ashy-brown, with the veins, in certain positions, of a fulvous or brownish hue, with broad whitish stripes running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parallel with them; the hind wings are pale ashy, with brown veins. The caterpillar feeds on the elm, and the moth appears in July and August. It is very rare, having occurred only near Darenth Wood, Kent, and in Norfolk.

PHLOGOPHORA, Stephens. (PHLOGOPHORA, pars, Curtis, Boisd., etc.)

Restricting this genus to the Angle-shades moth, it is characterised by the elongated fore wings, deeply undulated along the apical margin, which has a semicircular incision extending from the middle to the anal angle. The palpi have the terminal joint very short, obtuse, and scarcely visible; the thorax is crested behind, as well as slightly in front; the antennæ are slender and simple in both sexes. The caterpillar is naked, and neither tubercled nor hairy, and of a green colour. It feeds on herbaceous plants, and the chrysalis is enclosed in a slender cocoon, placed on the surface of the ground. This genus is closely allied to Euphasia (ante p. 170) in the folding of the fore wings, larvæ, etc.

SPECIES 1.—PHLOGOPHORA METICULOSA. Plate XLVIII., Fig. 5, 6.

Synonyme.—*Phal. Noctua meticulosa*, Linnæus; Fabr.; Hübner; Treitschke; Haworth; Donovan, 4, pl. 139; Albin, pl. 30, fig. 46, 47, a—e; Wilkes, pl. 3; Harris, Aurelian, pl. 41, fig. c—e; Wood, Ind. Ent., pl. 16, fig. 380.

This handsome insect measures about 2 inches in the expanse of the fore wings, which are of a pinkish-buff colour, with a large, obconical, central patch of brown, fulvous and reddish shades occupying the centre of the wing, in which the two ordinary stigmata are obsoletely represented of a paler tinge; from the posterior extremity of this patch, and towards the base of the wing, arises a smaller, irregular, somewhat triangular patch of a paler brown; and beyond the central patch is a broad stripe of pale colour, on which are two very slender angulated strigæ; the apical margin itself is rather olivaceous brown, with the apex rosy, a brown lunate spot being placed near the tip; the hind wings are whitish, with the veins, a central lunule, and a striga beyond the middle, and a broader subapical one brownish. The caterpillar is green or brownish, with an interrupted line down the back, and a pale lateral line. It feeds on nettles, chickweed, etc., and the moths appear in May and September, there being two broods in the year. Haworth and Stephens, indeed, describe it as having three broods in the year. It is a very common insect.

CUCULLIA, Schrank.

The fore wings are long and lanceolate in this numerous and difficult genus; the palpi, with the terminal joint, very short, obtuse, and scarcely visible; the antennæ long, slender, and alike in both sexes; the spiral tongue very long; the thorax crested; the body long and crested, bifid at the tip in the males. The caterpillars are long, cylindric, naked, and coloured and variegated; they feed on the flowers of syngenesious or scrophulariaceous plants, and the pupæ are enclosed in a cocoon, being furnished with a singular elongated appendage arising on the breast, enclosing the elongated spiral tongue. Stephens divides the genus into two sections, from the denticulated or entire wings; and Boisduval adopts the same sections, but characterises them from the food of the larvæ, these species with denticulated wings feeding on Verbascum and Scrophularia. The indigenous species of this section are grouped together in our 48th plate, whilst the rest with entire wings occupy the 49th plate.

SPECIES 1.—CUCULLIA VERBASCI. Plate XLVIII., Fig. 7, 8.

Synonymes.—*Phal. Noctua Verbasci*, Linnæus; Ochsenheimer; Fabricius; Hübner; Haworth; Albin, pl. 13, fig. 18, f—k; Harris, Aurelian, pl. 8, fig. a—e; Stephens; Rambin, Ann. Soc. Ent. France, 1833, pl. 1, fig. 6; Wood, Ind. Ent., pl. 16, fig. 378.

This species measures from 1¾ to 2 inches in the expanse of the fore wings, which are of a reddish-brown

colour, variable in intensity, with a broad white or whitish, irregular, longitudinal vitta placed behind the middle of the wing, and extending from the base to the cilia, but which is occasionally almost obsolete; the costal portion is reddish-brown, with an ashy shade, which insensibly blends into the ground-colour of the wing, three small whitish-grey dots being more conspicuous near the tip of the costa; there are also the traces of various fine lines, which cross the wing, and which are also more or less visible on the disk of the wing, three especially near the tip being more distinct, which are of a redder colour than in any of the allied species; along the inner margin of the wing is a dark bar, composed of confluent strigæ, interrupted before the anal angle by two white crescents; the hind wings are reddish-brown, with the base and anal margin pale. The caterpillar is slaty, or greenish-white, with four large dots of black, forming a square on the back of each segment, the anterior pair being round or oval, and the hind pair transverse; they are variable in size, and are sometimes confluent; along the sides of the body are a number of smaller black dots, four on each side being more conspicuous; besides which, there is a double row of yellow spots on the back, as well as a lateral series of similar spots; the head is yellow, spotted with black. The caterpillar is found from May to the end of August. It feeds on the species of Blattaria, Scrophularia, and Verbascum, more especially V. Thapsus, and it is the only species which seems to prefer the leaves to the flowers; the moth appears in May, and is a comparatively common species.

SPECIES 2.—CUCULLIA SCROPHULARIÆ. PLATE XLVIII., FIG. 9, 10.

SYNONYMES.—*Noctua Scrophulariæ*, Hübner; Ochsenheimer; Treitschke; Engramalle; Stephens; Rambur, Ann. Soc. Ent. de France, 1833, pl. 1, fig. 1; Wood, Ind. Ent., pl. 16, fig. 377. *Ph. N. Verbasci*, Wilkes, 7, pl. 15; Donovan, 8, pl. 257?

This species measures about $1\frac{3}{4}$ inch in the expanse of the fore wings (this, therefore, is smaller than the preceding species, with which it has been often confounded), which are of a more buffish-yellow colour, and not so brown as in C. Verbasci; the costa is ashy-brown, sometimes blackish; the lines at the tip of the wing are less tinged with red, and there is a fourth well-marked line arising from the margin, and which is not apparent in that species; the median vein is slightly dotted, there are five or six of these dots, some placed near the costa. The lines which cross the wing are less distinct, and the dark streak along the inner margin is of a brown shade, traversed by two whitish crescents. The hind wings are of a brown colour, but slightly tinged with red; the crest of the thorax is margined with red-brown, and the tippets are powdered with red scales, forming a slight bar. The caterpillar closely resembles that of C. Verbasci, but it is always smaller; the two black posterior spots on each segment are more elongated, sometimes touching the dot above the spiracles; they are generally confluent together, as well as with the anterior pair of dots, in that case forming a X-like mark on the back. The small black lateral marks are obsolete, and there is only a single row of yellow dorsal patches. The caterpillar feeds exclusively on Scrophularia nodosa and aquatica and Verbascum Blattaria and Blattariodes, preferring the flowers and seeds. It is found at the end of the summer, and the moth appears in May. It is widely dispersed, but more rare than the preceding insect.

SPECIES 3.—CUCULLIA THAPSIPHAGA. PLATE XLVIII., FIG. 11, 12.

SYNONYMES.—*Cucullia thapsiphaga*, Treitschke; Stephens (but not of Wood); Duponchel; Boisduval; Rambur, in Ann. Soc. Ent. de France, 1833, pl. 1, fig. 2.

This species measures rather more than $1\frac{3}{4}$ inch in the expanse of the fore wings, which are of an ashy-buff colour; the costa and inner margin brown; the former is gradually shaded off to the ground-colour of the wing, and is marked with numerous reddish-brown, slightly distinct spots and lines, and by three more distinct whitish dots near the tip; along the front margin of the median vein are several small dark dots, as well as at the

extremity of the discoidal cell; the dark margin along the inside of the wing is interrupted by the pale crescents, which form the extremity of the third ordinary striga; these are placed in a less oblique direction than in the allied species, the innermost one followed by a dark striga reaching to the apical margin, which bears the rudiments of a pale submarginal striga: the hind wings are pale ashy-buff at the base, with the border dusky. The caterpillar is of a yellowish-white colour, with two slight brownish bands along the back, which are paler in the middle of each segment; they are separated by an irregular yellowish dorsal stripe; there are also several minute black specks dispersed over each segment, and there is a dusky stripe above the spiracles. It feeds on Verbascum Lychnitis and some allied species of the same genus, but not on V. Thapsus, according to M. Rambur. Taken near London and Cheltenham. The insect in the British Museum, referred to by Mr. Stephens (Ill. H., vol. iii. p. 87) under this species, is C. solidaginis.

SPECIES 4.—CUCULLIA LYCHNITIS. PLATE XLVIII., FIG. 13, 14.

SYNONYMES.—*Cucullia Lychnitis*, Rambur, in Ann. Soc. Ent. de France, 1833, pl. 1, fig. 3; Boisduval.
C. Scrophulariæ (variety), Treitschke; Freyer.

This species is about the size of C. Scrophulariæ, from which it differs in the wings being rather more elongated; they are of a reddish-buff colour; the costa grey-brown, with a slight tinge of red, marked by tranverse lines: the lines which arise from the outer margin near the tip of the wing are but slightly marked; the pale shade near the posterior angle is larger than in C. Scrophulariæ, whilst the line by which it is edged anteriorly is more distinct; the two crescent-like marks on the inner margin of the wing are of its ground-colour; the basal striga is slightly marked, its angulations being much elongated; the stigmata are very imperfectly discernible, the round one marked with four small black dots on the margin, and the reniform one with ten or twelve similar dots. The hind wings are pale. The caterpillar resembles that of C. Scrophulariæ; the two hind spots on the back of each segment are elongated, confluent together, and often also united to the spot above the spiracles; the two intermediate lateral spots are also often confluent, thus forming an oblique line; each segment is marked with a semicircle of yellow, on which the spots are placed. It is occasionally almost entirely yellow, with the spots more or less indistinct. It feeds on Verbascum Lychnitis, sinuatum, nigrum, etc., of which it eats the flowers and seeds. We understand that Mr. Ingall possesses a British specimen, which has been assigned to this species.

SPECIES 5.—CUCULLIA PRENANTHIS. PLATE XLVIII., FIG. 15.

SYNONYMES.—*Cucullia prenanthis*, Boisduval. *N. Sp.*, Guénée. *Cucullia Blattariæ*, Duponchel, pl. 124 (nec Esper).

This species is about the size of C. Verbasci, from which is differs in having the costal portion of the fore wings darkly and broadly shaded with red-brown, which extends more than half-way across the wing, with scarcely any traces of darker markings; near the apex of the costa are three small pale dots, and the second stigma is indicated by a pale patch. There is a rather narrow whitish band running longitudinally from the base almost to the apical margin, behind which is a stripe of red-brown colour, interrupted towards the anal angle by the two white crescents placed very obliquely, beyond which there are two red-brown bars; there are also two other brown dashes in the middle towards the apical margin, and two shorter ones towards the tip; the hind wings are pale reddish-brown, with the margin much darker: the thoracic crest and abdominal segments are tufted with red-brown hairs. Mr. Stephens possesses two British specimens, which accord with Duponchel's figure of this species.

DESCRIPTION OF PLATE XLIX.

INSECTS.—Fig. 1. Cucullia solidaginis (the shepherd's purse). 2. The Caterpillar.
" Fig. 3. Cucullia asteris (the starwort). 4. The Caterpillar, in which some varieties have the pink tint replaced with green.
" Fig. 5. Cucullia absinthii (the wormwood).
" Fig. 6. Cucullia umbratica (the large pale shark). 7. The Caterpillar
" Fig. 8. Cucullia tanaceti (the tansy shark). 9. The Caterpillar.
" Fig. 10. Cucullia lactucæ (the lettuce shark). 11. The Caterpillar.
" Fig. 12. Cucullia lucifuga (the large dark-shark). 13. The Caterpillar. 17. The Chrysalis.
" Fig. 14. Cucullia chamomiliæ (the chamomile shark). 15. The Caterpillar.
" Fig. 16. Cucullia artemisiæ (the green silver spangle).
PLANT.—Fig. 18. Aster Tripolium (the Sea Starwort).

Cucullia solidaginis is from the specimen in the British Museum; C. artemisiæ and C. asteris from specimens in the cabinet of Mr. Bentley. The other five species are from the cabinet of J. F. Stephens, Esq. It is extremely difficult to make out any characteristic distinctions in these five species, whilst the larvæ sufficiently prove that they are distinct; but until the larvæ have all been found in Britain, I should doubt whether we have more than one or two *British* species, varieties of which we have been tempted to consider the distinct continental species. Mr. Bentley possesses a specimen of this group, which may possibly belong to a sixth allied species. The distinctions of the species, as arranged in the cabinet of Mr. Stephens, appear to be as follows:—

Umbratica has the front wings a paler grey than the others, with the tinting in front rather pale ochreous than brown, while the hind wings are very clear, with a suffused narrow border of light brown.

In tanaceti the grey is stronger, and the ochreous tint becomes brown in the fore wings, and the hind wings have a broader and darker border or shade at the edge. Lucifuga has still more brown in the fore wings, and the hind wings are entirely dusky brown, with a narrow fringe somewhat paler.

Lactucæ is very similar, but having the fore wings relieved here and there with clearer grey, while the hind wings, though all brown, are lighter near the body, and have a broadish pale fringe.

Chamomillæ is smaller than the others, and much deeper in colour than any of them, with the marks on the fore wings more clouded and indistinct, the hind wings, with the fringe, are all deep full brown; but the specimen appears to be a female, and some male, reputed specimens of Chamomillæ, in the British Museum, are paler and clearer, but possessing the same general character.

I should add, that these descriptions do not agree very well with those of continental authors; nor do the continental authors in this difficult instance agree very well with each other.

The caterpillar of Solidaginis is from the Transactions of the Ent. Soc., the others from Hübner. H. N. H.

SPECIES 6.—CUCULLIA SOLIDAGINIS. PLATE XLIX., FIG. 1, 2.

SYNONYMES.—*Cucullia solidaginis*, Stephens, in Trans. Ent. Soc. Lond., vol. ii. pl. 3, fig. 7.
Cucullia thapsiphaga, Wood, Ind. Ent., pl. 16, fig. 389 (not of Treitschke).

This species measures about 1¾ inch in the expanse of the fore wings, which are entire along the apical margin, and pale ashy-brown varied with whitish ash; the costa marked at the tip with dark and whitish oblique streaks; the stigmata are very distinct, with a double blackish margin, the anterior one preceded by a slender duplicated striga interrupted behind; near the anal angle on the inner margin is a short slightly flexuous hoary streak, edged with brown, and on the anal angle a brown patch with a short black dash, the apical margin with a slender waved whitish line; hind wings dark brown, the base paler; the thoracic crest and abdominal tufts dark brown. The caterpillar is long, slender, naked, pale green, with a row of slender reddish lunules above the spiracles, and a series of diamond-shaped spots of red down the back. It feeds on Solidago virgaurea, and has occurred in Birch Wood, Kent, in September, the moth appearing in the following June, but it is very rare.

SPECIES 7.—CUCULLIA ASTERIS. PLATE XLIX., FIG. 3, 4.

SYNONYME.—*Noctua asteris*, Wien. Verz.; Fabricius; Esper; Treitschke; Hübner; Haworth; Curtis, Brit. Ent., pl. 45; Duponchel; Boisduval; Stephens; Wood, Ind. Ent., pl. 16, fig. 379.

This species measures from 1¾ to 2 inches in the expanse of the fore wings, which are entire along the apical margin, with the costa deep chestnut, behind which is a brighter shade of brown, blending into a blue-grey, with

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streaks of pale red-brown; the stigmata are irregular and broken into small spots of red-brown, the inner margin is deep chestnut, with ashy and black hues interrupted by a pale grey crescent edged with a chestnut lunule; the hind wings are brown, with the base ashy; the thorax crested, and abdomen tufted with red-brown. The caterpillars vary considerably in colour, being pinkish or green with darker longitudinal lines, and a pale yellow stripe down the back, and another on each side above the spiracles. It feeds on the golden rod and China aster. It is rare in this country, but has been found, in September, at Darenth Wood, Kent; also near Croydon; Fulham; in Norfolk; also near Dulwich Wood, in June, by Mr. Douglas. The moth appears in July.

SPECIES 8.—CUCULLIA ABSINTHII. PLATE XLIX.; FIG. 5.

SYNONYMES.—*Phal. Noctua absinthii*, Linnæus; Hübner; Fabricius; Trietschke; Duponchel; Haworth; Stephens; Wood, Ind. Ent., pl. 16, fig. 387; Donovan 9, pl. 304. *Phalæna punctigera*, Hufnagle.

This species measures about $1\frac{1}{2}$ inch in the expanse of the fore wings, which are of a hoary-ash colour, varied with brown clouds and darker dots and patches; the base is pale, and marked with several small dark dots, followed by a strongly-dentated pale striga edged with dark brown on each side; the place of the stigmata is occupied by several blackish dots, some being placed in a square representing the anterior stigma, between which and the outer stigma runs a dark striga to the costa; the apical margin has a row of black dots; and the costa is marked near the apex with several small white dots. The hind wings are pale hoary, with a dark border; the abdominal segments and thoracic crests with dark tufts. The caterpillar is green, with yellow streaks and red spots. It feeds on different species of Artemisia. It used to be taken plentifully sixty years ago in Bunhill-fields, but it has in late times been found on the coasts of Devonshire and South Wales, where it is not uncommon.

SPECIES 9.—CUCULLIA UMBRATICA. PLATE XLIX., FIG. 6, 7.

SYNONYMES.—*Phalæna Noctua umbratica*, Linnæus; Ochsenheimer; Hübner; Haworth; Donovan, 8, pl. 262, fig. 2; Boisduval; Stephens; Wood, Ind. Ent., pl. 16, fig. 381; Rambur; Rosel, vol. 1. pl. 25, fig. 3, 6; Engramelle, pl. 248, fig. *c—d—e*; Hübner, larvæ, 4, pl. 223, 20, and 223, *a—b*.

This species measures from $1\frac{3}{4}$ to 2 inches in the expanse of the fore wings, which are very pale grey, shaded towards the costa with pale ochre, with fine streaks of ashy and black, some of which are much angulated and duplicated, faintly representing the ordinary striga; there is a more distinct black streak running from the base of the wing, beyond which, towards the costa, are three or four small black spots, between which and the apical margin is another faint angulated striga edged with whitish on the outside; the apical margin itself with a row of short black lines; the hind wings are clear whitish, with a slight brown margin. The caterpillar is dark brown or obscure grey, with a row of red spots down the back, two being placed on each segment, and another row on each side above the spiracles. It feeds on different species of Sonchus. The moth appears in the middle of July; it is widely dispersed, and by no means rare.

SPECIES 10.—CUCULLIA TANACETI. PLATE XLIX., FIG. 8, 9.

SYNONYME.—*Noctua Tanaceti*, Wien. Verz.; Fabricius; Hübner; Ochsenheimer; Haworth; Stephens; Wood, Ind. Ent., pl. 16, fig. 382.

This species measures $1\frac{3}{4}$ or nearly 2 inches in the expanse of the fore wings, which are of a darker or more slaty grey than in the last species, shaded to brown on the fore and hind margins, and with the streaks and dots of black much more distinct; the black basal streak is present, reaching nearly to the middle, and followed by a shorter one (behind the place of the stigmata, which are slightly indicated by black dots); the costa is marked near the apex with several pale dots, and the apical margin with black streaks; the inner margin has a more distinct streak, interrupted before the anal angle by an angulated pale line, being the basal rudiment of the third ordinary striga; the apical angle bears two black dashes; the veins are brownish; the hind wings nearly

white, with a broader dusky margin than in the preceding. The caterpillar is slaty or ash-coloured, with numerous black spots arranged in longitudinal lines, and with a rather broad dorsal and lateral yellow line. It feeds on tansy, wormwood, chamomile, etc., and the moth appears in June and September, according to Boisduval, but Stephens gives the end of July. It is a rather rare but widely-dispersed species.

SPECIES 11.—CUCULLIA LACTUCÆ. PLATE XLIX., FIG. 10, 11.

SYNONYMES.—*Noctua Lactucæ*, Wien. Verz.; Fabr.; Ochsenheimer; Haworth; Stephens; Wood, Ind. Ent., pl. 16, fig. 384; Rosel, t. 1, pl. 442, fig. 1—5; Hübner, larv., 4, pl. 222, fig. 1 *a*; Engramelle, fig. 368, *a—e*; Duponchel, pl. 126, f. 2.
Noctua lucifuga, fig. 262.

This species measures nearly two inches in the expanse of the fore wings, which are of a rather dark greyish or slate colour, relieved by paler grey shades, and with a reddish, obscure spot towards the centre, and various streaks and angulated slender lines of brownish-black; the apex with several pale slender lines; the inner margin deep ashy-brown, with several pale and dusky waved streaks; the apical margin with a slender interrupted black line; the hind wings brown, with the base rather paler; the veins dusky. The caterpillar is yellow, with a row of red dots down the middle of the back, and each segment with two large black patches on each side, as well as several small black dots above the feet; the head black, with a yellow slender line down the face. It feeds on various species of sonchus, lettuce, etc., and the moth appears in July. Taken, rarely, in the woods round London, as well as in Yorkshire.

SPECIES 12.—CUCULLIA LUCIFUGA. PLATE XLIX., FIG. 12, 13, 17.

SYNONYME.—*Noctua lucifuga*, Wien. Verz.; Ochsenheimer; Haworth; Stephens; Wood, Ind. Ent., pl. 16, fig. 383; Rosel, v. 1, pl. 25, fig. 1, 2, 4, 5; v. 3, pl. 71, fig. 10; Hübner, larvæ, pl. 223, 1 *a*, 6; Engramelle, t. 6, pl. 248, fig. 369 *a*.

This species measures two inches in the expanse of the fore wings, which are of a slaty-brown colour, with black longitudinal lines, streaks, and veins; the costa pale at the base and beyond the middle, with several small whitish spots; the apical margin also with longitudinal whitish lines edged with grey; the disk indistinctly dotted; the apical margin with a transverse ashy-white streak; hind wings deep ashy-brown; the cilia pale. The caterpillar is dark greenish or ashy colour, with numerous black spots, some of which form a row on each side of the back, which is red-brown down the middle and at the sides, the latter bordered by a slender whitish line above the feet. The perfect insect appears in July, and is comparatively rare, although frequenting the same localities as the last species.

SPECIES 13.—CUCULLIA CHAMOMILLÆ. PLATE XLIX., FIG. 14, 15.

SYNONYMES.—*Noctua Chamomillæ*, Wien. Verz.; Fabricius; Hübner; Esper; Treitschke; Boisduval; Haworth; Stephens; Wood, Ind. Ent., pl. 16, fig. 385.
Noctua fissina, Haworth (a dark variety).

This species varies from $1\frac{1}{2}$ to $1\frac{3}{4}$ inch in the expanse of the fore wings, which are of a much darker ashy colour than the preceding species, with the markings more clouded and indistinct; the striæ being very slender; the spaces between them along the apical margin of the wing being longitudinally striped with whitish and ashy; the base with a distinct black streak terminated in a deeply angulated pale patch; the costa is marked with several pale dots, and the pale mark beyond the middle of the inner margin is deeply angulated; the hind wings are deep brown, with the base rather paler; the males being paler coloured than the females. The caterpillar is of an ashy-buff colour, with two curved brown streaks on each side of each segment. It feeds on chamomile flowers, and the moth appears at the end of May and in June. This is a rare species, but is found in various places near London, Birch Wood, Putney Heath, and Wimbledon Common, also in Essex, Hampshire, and Devonshire.

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SPECIES 14.—CUCULLIA ARTEMISIÆ. PLATE XLIX., FIG. 16.

SYNONYMES.—*Ph. Noctua artemisiæ*, Wien. Verz.; Fabricius; Hübner; Treitschke; Stephens; Wood, Ind. Ent., pl. 16, fig. 390.
Noctua argentea, Esper; Fuesly, pl. 5, fig. 1—7.

This lovely insect measures 1½ inch in the expanse of the fore wings, which are of a bright green, with seven or eight silvery patches and streaks; the hind wings whitish, with the margin slightly dusky; the ciliæ of all the wings white. The caterpillar differs from its congeners, being pilose, green with white spots, and red tubercles along the sides and back. It feeds on Artemisia sylvestris; and the moth is produced in June and July. It is unique in the British Museum, having been taken near Dedingstone.

Obs.—CUCULLIA GNAPHALII was introduced by Mr. Curtis as a British species in mistake for C. solidaginis.

DESCRIPTION OF PLATE L.

INSECTS.—Fig. 1. Chariclea Delphinii (the pease-blossom). 2. The Caterpillar.
„ Fig. 3. Calophasia Linariæ (the flax-moth). 4. The Caterpillar. 12. The Chrysalis.
„ Fig. 5. Eremobia Ochroleuca (the dusky sallow).
„ Fig. 6. Abrostola Triplasia (the dark spectacle). 7. The Caterpillar.
„ Fig. 8. Abrostola Urticæ (the spectacle). 9. The Caterpillar.
„ Fig. 10. Abrostola Asclepiadis. 11. The Caterpillar.

PLANT.—Fig. 13. Linaria repens (the creeping toad-flax).

The insects in this plate are all from the cabinet of Mr. Bentley and Mr. Stephens; the larvæ are from Hübner. H. N. H.

CHARICLEA, STEPHENS.

This genus has the palpi short, and entirely clothed with hairs; the antennæ simple in both sexes; the thorax slightly crested; the abdomen without tufts; the fore tibiæ terminated by two horny curved spines; the wings beautifully coloured, and with the ordinary markings rather indistinct. The caterpillar is like those of the Cuculliæ, naked, smooth, and maculated with black and striped with yellow. The chrysalis has not an elongated tongue-case.

SPECIES 1.—CHARICLEA DELPHINII. PLATE XLV., FIG. 1, 2.

SYNONYME.—*Phalæna Noctua delphinii*, Linnæus; Wilkes, 3, fig. 4; Donovan, 10, pl. 331; Curtis, Brit. Ent., pl. 76; Wood, Ind. Ent., pl. 16, fig. 388.

This lovely insect measures about 1¼ inch in the expanse of the fore wings, which are of a rosy tint, with lilac shades; a pale trilobed slender striga, preceded by a brown shade, is placed before the anterior stigma, which is small, round, and pale buff-coloured, resting upon a square blotch of the same colour; between it and the outer stigma is a slender curved rosy striga; the outer stigma being purplish, followed by a slender curved pale striga edged on both sides with a brown streak; the apical margin pale, with a dark apical line; the hind wings pale, with a dusky submarginal bar and central lunule; the margin itself rosy. It varies in the splendour of the fore wings, our figure giving its least brilliant appearance. The caterpillar is pale lilacy-ash, spotted with black and with yellow lateral marks. It feeds on the wild larkspur. The perfect insect is extremely rare, but has been taken at Chelsea, Windsor, and in Bulstrode Park.

CALOPHASIA, STEPHENS. CLEOPHANA, GUENÉE, DOUBLEDAY.

This genus has the palpi short and subclavate, with the last joint slightly visible; the antennæ simple in both sexes; the head and thorax crested; the abdominal segments not tufted; the fore wings short. The caterpillars

are slender at each end of the body, naked, and smooth; and the chrysalis has a tongue-case extending beneath the body.

SPECIES 1.—CALOPHASIA LINARIÆ. PLATE L., FIG. 3, 4, 12.

SYNONYMES.—*Noctua linariæ*, Wien. Verz.; Fabricius; Hübner; Stephens, Ill. H., 3, pl. 29, fig. 2; Wood, Ind. Ent., pl. 16, fig. 391. | *Noctua stictica*, Fabricius; Mant. *Ph. lunula*, Hufnagle.

This interesting species measures about $1\frac{1}{4}$ inch in the expanse of the fore wings, which are varied with brown, ashy, and luteous colours; the costa is spotted with these colours, and the base of the wing luteous, followed by an irregular, luteous, transverse, waved, but interrupted striga, which bears a black dash between the stigmata; behind this is a pale line, representing the supplemental stigma; the outer stigma indicated by a kidney-shaped white spot, followed by a pale curved striga, beyond which is a series of black longitudinal dashes, followed by an arched pale striga; the cilia and apex spotted with black. The hind wings brown, with the base pale. The caterpillar is grey, with black specks, and yellow and slender black longitudinal lines. It feeds on the flowers of the common toad-flax. Very rare; taken near Woodside, Epping.

EREMOBIA, STEPHENS. ILARUS, GUENÉE.

This genus has the palpi short, with the terminal joint naked and acute; the antennæ simple in both sexes; the thorax crested behind; the abdominal segments tufted; the fore wings slightly dentate on the apical margin, with the markings somewhat confused, and the apical margin rounded. The caterpillar is cylindric, slender, setose; the chrysalis is cylindro-conic, smooth, and enclosed in a slight cocoon. The perfect insect appears at the beginning of summer.

SPECIES 1.—EREMOBIA OCHROLEUCA. PLATE L., FIG. 5.

SYNONYMES.—*Noctua ochroleuca*, Wien. Verz.; Esper; Treitschke; Duponchel; Stephens; Wood, Ind. Ent., pl. 16, fig. 392. *Noctua flammea*, Hübner. | *Noctua citrina*, Haworth; Donovan, 10, pl. 340, fig. 2. *Phytometra bifasciosa*, Haworth (variety).

This species varies from $1\frac{1}{3}$ to $1\frac{1}{2}$ inch in the expanse of the fore wings, which are varied with pale buff and ochre colour, and brown maculated strigæ, edged with white lines; preceding the stigmata is a pale angulated striga, followed by a dark brown patch, enclosing the anterior confused stigma; and behind this is another brown patch, separated from the former by a pale line; the outer stigma is large and luteous, followed by a pale angulated striga, and a brown irregular fascia, which is succeeded by the pale subapical striga; the apical margin and cilia varied with brown and buff spots. The hind wings brown, with a dusky margin.

The caterpillar is pale yellow, with an orange stripe on each side, varied with small setose dots. It feeds on cerealeous plants, devouring the grain. The moth appears in July, frequenting heathy downs, especially the downs of Surrey and Kent; also in Norfolk, Essex, and Bedfordshire.

ABROSTOLA, OCHSENHEIMER.

This genus has the antennæ simple in both sexes; the palpi laterally compressed, much elevated, with the terminal joint long; the thorax with two tufts of hairs; the abdomen crested in both sexes; the fore wings very acute at the tip, shiny, but obscurely coloured; the caterpillars are long, moniliform, with a small flat head; the anterior segments much attenuated, the eleventh elevated; they have five pairs of pro-legs; the two anterior are not used in walking, but are elevated, and the body generally curved. They feed on low herbs; the chrysalides are enclosed in cocoons of silk, spun between the leaves and bark of trees.

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SPECIES 1.—ABROSTOLA TRIPLASIA. Plate L., Fig. 6, 7.

Synonyme.—*Phal. Noctua triplasia*, Linnæus; Ochsenheimer; Hübner; Haworth; Stephens; Wood, Ind. Ent., pl. 16, fig. 393.

This species measures rather more than 1⅓ inch in the expanse of the fore wings, which are of an ashy-brown colour, with the base rusty-grey, shaded with rather paler tints, and followed by a slender, curved, black line, edged within with reddish-grey; the characteristic portion of the wing is very broad, and bears three stigmata, rather paler than the disk of the wing, with slender black edge-lines; beyond the stigmata is another arched black line, directed outwards, and edged externally with grey, followed by two obsolete, lunulated strigæ, and two or three black dashes near the tip; the hind wings dusky, with the margin and central lunule darker. The caterpillar is olive-green, with white streaks on the pedigerous segments; the two following with large black spots on the back, and in all the following with lateral, oblique, white streaks, edged with black. It feeds on the common nettle; and the moth appears in July, and is a common species in the south of England.

SPECIES 2.—ABROSTOLA URTICÆ. Plate L., Fig. 8, 9.

Synonymes.—*Noctua urticæ*, Hübner; Stephens; Wood; Ind. Ent., pl. 16, fig. 394.
Noctua asclepiadis, Haworth.
Noctua triplacea, Donovan, 9, pl. 298.

This species is rather larger and paler coloured than the preceding; the thorax is more distinctly marked in front, with two ocellated spots; the fore wings are whiter at the base, without any tinge of rust-colour; the stigmata are paler, with black edge-lines; the striga beyond them is less arched, and the striga next the apical margin is broader, forming a fascia attenuated towards the apex, where it passes through two black dashes, which are confluent. In other respects it closely resembles the preceding; but the caterpillar is different, varying in colour from grass-green to fleshy-pink, with a pale line on each side, above the feet; the fourth and fifth segments with a black dorsal patch, and some white spots on the sides of the other segments. It feeds on the nettle, and the moth appears in July. It is a common and widely-dispersed species.

SPECIES 3.—ABROSTOLA ASCLEPIADIS. Plate L., Fig. 10, 11.

Synonyme.—*Noctua asclepiadis*, Wien. Verz.; Fabricius; Stephens; Wood, Ind. Ent., pl. 54, fig. 50.

This species measures 1⅓ inch in the expanse of the fore wings, which are blackish-brown, paler at the base, with an abbreviated, duplicated, black, angulated, basal striga, followed by a black one, curved and crossing the wing, edged within with rusty-colour; the characteristic part of the wing dark, and bearing three stigmata, the first and supplemental ones being confluent; the third striga is straighter and waved, strongly angulated in front, and edged externally with rusty; the fourth striga is pale, wavy, passing through a duplicated black spot near the tip of the wings. The hind wings brown, paler at the base. The caterpillar is pale, with black dots, and a slender, pale green, dorsal line, and a yellow lateral stripe. It feeds on Asclepias vincetoxicum. It is doubtful whether this be a native species.

DESCRIPTION OF PLATE LI.

Insects.—Fig. 1. Cloantha perspicillaris.
" Fig. 2. Plusia illustris (the purple shades). 3. The Caterpillar.
" Fig. 4. Plusia percontationis (the plain golden Y).
" Fig. 5. Plusia bimaculata (the double spotted spangle).
" Fig. 6. Plusia interrogationis (the scarce silver Y).
" Fig. 7. Plusia gamma (the silver Y). 8. The Caterpillar.

INSECTS.—Fig. 9. Plusia festucæ (the gold spot). 10. The Caterpillar.
" Fig. 11. The Caterpillar of Plusia circumflexa.
" Fig. 12. The Caterpillar of Plusia chrysitis.
PLANTS.—Fig. 13. Festuca fluitans (fescue-grass).
" Fig. 14. Aconitum napellus (monkshood).

C. perspicillaris is from a beautiful drawing by Mr. Paget, kindly lent me by Mr. H. Doubleday. P. illustris, P. percontationis, and P. interrogationis are from specimens in the cabinet of Mr. Bentley. P. gamma and P. festucæ are from specimens furnished by Mr. H. Doubleday, and P. bimaculata is from the fine specimen in the cabinet of Mr. J. F. Stephens. The caterpillars are from Hübner. H. N. H.

CLOANTHA, BOISDUVAL.

This genus has the antennæ filiform, and alike in both sexes; the palpi are of the ordinary form, the terminal joint being scarcely visible; the head is cucullated, the thorax being crested; the abdomen has the segments tufted above; the fore wings are prettily ornamented with somewhat radiating marks, and a single small round stigma; the caterpillars are striped; they feed during the night upon the species of Hypericum, having a minute head and the fore part of the body attenuated.

SPECIES 1.—CLOANTHA PERSPICILLARIS. PLATE LI., FIG. 1.

SYNONYME.—*Phal. Noctua perspicillaris*, Linnæus; Clerck, Icones, t. 2, f. 3; Ochsenheimer; Ernst; Boisduval; Wood, Ind. Ent., pl. 54, fig. 45; Paget; Doubleday.

This species measures about 1½ inch in the expanse of the fore wings, which are of a reddish colour, having a broad, pale yellowish fascia running from the base nearly to the apical margin, where it is united with two pale, strongly-dentated marks, one before the middle, and the other towards the anal angle; the inner margin is brown, with several blackish lines towards the base; the hind wings are brown, with the base pale, and a minute black spot. A beautiful specimen of this insect was taken several years ago in a garden in Yarmouth, at the end of June. It had only just emerged from the chrysalis; for, when first observed, its wings were not expanded. It is now in the collection of Mr. Paget, of that town.

PLUSIA, OCHSENHEIMER.

This lovely group of insects is distinguished by its elevated palpi, with the terminal joint considerably elongated; the thorax has the collar rather elevated, the tippets with a strong bifid crest; the abdomen is tufted along the back of the anterior segments; the fore wings near the apical margin more or less sinuated, the tip acute, and the disk ornamented with splendid colours; the caterpillars are much attenuated in front, with only three pairs of pro-legs, two pair ventral, and one pair anal; they have the body slightly setigerous. The chrysalides are enclosed in a slight silken cocoon.

SPECIES 1.—PLUSIA ILLUSTRIS. PLATE LI., FIG. 2, 3.

SYNONYMES.—*Noctua illustris*, Fabricius; Ochsenheimer; Hübner; Haworth; Curtis, Brit. Ent., pl. 731; Guénée; Stephens (Abrostola i.); Wood, Ind. Ent., pl. 16, fig. 396. *Noctua cuprea*, Esper (female).

Although figured by Mr. Curtis in illustration of the genus Plusia, the present insect is a very aberrant species from the true gold-spangled types of the genus. It measures rather more than 1½ inch in the expanse of the fore wings, which are of a greenish-brown and very glossy, with an oblique pale line, edged externally with black, extending from the inner margin near the base to the anterior stigma, which is oblique and elliptic, divided by a slender pale line into two parts, the outer stigma is succeeded by a rosy patch; beyond the stigmata is a flexuous striga, rosy externally, and pale inwardly; the subapical striga nearly straight and pale,

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as well as the margin itself; the hind wings are brown, rather darker along the margin, and with a short fascia near the middle. The caterpillar is green, with a dark dorsal and pale lateral lines, and black setigerous tubercles. It feeds on Aconitum lycoctonum and Thalictrum aquilegifolium, in May and June, when it forms a delicate cocoon, and the moth appears in June and July. Formerly taken in some numbers on Salisbury Plain, and since in South Wales, by Mr. Donovan.

DESCRIPTION OF PLATE LII.

INSECTS.—Fig. 1. Plusia Iota (the beautiful golden Y). 2. The Caterpillar.
" Fig. 3. Plusia circumflexa (the Yorkshire Y). The Caterpillar is figured in Plate LI.
" Fig. 4. Plusia chalcytis.
" Fig. 5. Plusia aurifera (the slender burnished brass).
" Fig. 6. Plusia Chrysitis (the burnished brass). The Caterpillar is figured in Plate LI.
" Fig. 7. Plusia orichalcea (the scarce burnished brass).
" Fig. 8. Plusia bractea (the gold spangle).

Plusia Iota, chalcytis, and aurifera are from specimens in the British Museum; circumflexa is from the unset specimen in the cabinet of Mr. J. F. Stephens; P. orichalcea and P. bractea are from specimens in the collection of Mr. S. Stevens; and the others are from specimens furnished me by Mr. H. Doubleday. The caterpillar is from Hübner. H. N. H.

SPECIES 2.—PLUSIA IOTA. PLATE LII., FIG. 1, 2.

SYNONYMES.—*Phalæna Noctua Iota*, Linnæus; Fabricius; Hübner; Treitschke; Haworth; Stephens. | *Noctua interrogationis*, Esper. *Plusia percontationis*, Wood, Ind. Ent., pl. 16, fig. 397.

This species measures rather more than 1½ inch in the expanse of the fore wings, which are of a rich purplish-brown colour varied with dark brown, and fulvous; near the base of the wing is a slender, waved, pale striga, followed by a transverse dark fascia, and a second undulated striga; the discoidal cell is purplish, with the anterior stigma small, and placed obliquely; it is brown, and slightly edged with golden scales behind; the outer stigma is brown and deeply notched on the outside, and with a slender golden edging; the characteristic space behind the stigmata is dark brown, varied with fulvous, and bears two gold spots, one like the letter V, and the other an oval dot placed longitudinally; the third striga is slender, pale, and margined with brown lines, and angulated towards the inner margin; the apical portion of the wing is varied with the colours above mentioned, with a golden gloss in the middle, and bears the fourth slender dark brown striga, which is deeply bidentate in the middle; hind wings reddish-ash, with the veins, margin, and central fascia brown. The caterpillar is green, with whitish lines and stripes. It feeds on burdock, nettles, etc. The moth is far from rare, and widely dispersed, affecting woods, and occurring in July.

SPECIES 3.—PLUSIA PERCONTATIONIS. PLATE LI., FIG. 4.

SYNONYMES.—*Plusia percontationis*, Ochsenheimer; Stephens.
Noctua Iota, Esper; Donovan, 8, pl. 256, fig. 1; Haworth; Wood, Ind. Ent., pl. 16, fig. 398.

This species is rather larger and less variegated than the preceding species, the fore wings being of a rich rosy-brown, varied with dark brown patches; the strigæ are much less undulated and plainer, the third being nearly straight towards the anal angle; the stigmata are very obsolete, and destitute of the golden edging of the preceding species; the golden markings behind the median vein are much smaller; the fourth or subapical striga is obscure, and but slightly bidentate in the middle. The hind wings are not so strongly marked with the brown veins as in P. Iota. It has been considered by many writers as a variety of the last-named species, but Mr. Stephens is fully persuaded of their distinctness. The present species appears at the end of June, frequenting lanes in preference to woods,—a peculiarity mentioned by the late Mr. Standish, sen., to Mr. Stephens.

SPECIES 4.—PLUSIA BIMACULATA. PLATE LI., FIG. 5.

SYNONYMES.—*Plusia bimaculata*, Stephens; Wood, Ind. Ent., pl. 16, fig. 399.
Plusia Iota (variety), Curtis.
Noctua inscripta, Stephens's Cat., nec Esper.

This species measures 1⅝ inch in the expanse of the fore wings, which are "varied with fuscous-brown and ferruginous, with a biundulated golden striga at the base, enclosing a black spot; then another, similarly coloured, before the stigmata, much angulated at the origin on the costa, and waved interiorly, followed behind the stigmata by an obscure, crenulated, bent one, without metallic ornament; stigmata very obsolete, without golden edges; on the disk are two large, bright, golden spots; the anterior emarginated towards the base, and rounded posteriorly; the hinder triangular-ovate; between the anterior one and the costa is a faint golden lunule, as in Pl. Iota; hind wings reddish-ash, with a central lunule, an oblique striga, and the hinder margin and nervures dusky." A single specimen of this species is in the unrivalled collection of J. F. Stephens, Esq. (whose description we have quoted above), but its locality is unknown. Mr. Curtis regarded it as a probable variety of Pl. Iota, whilst Mr. H. Doubleday has omitted it from the list of British Noctuæ, considering it, as he informs me, as an apparently North American species.

SPECIES 5.—PLUSIA INTERROGATIONIS. PLATE LI., FIG. 6.

SYNONYMES.—*Phalæna Noctua interrogationis*, Linnæus; Fabricius; Hübner; Haworth; Harris, Exposition, pl. 5, fig. 3; Treitschke; Boisduval; Duponchel; Stephens; Wood, Ind. Ent., pl. 16, fig. 400.
Phalæna auro-signata, Donovan, 13, pl. 453.
Noctua æmula, Borkhausen.

This species measures from 1¼ to nearly 1½ inch in the expanse of the fore wings, which are slaty-grey, elegantly varied with ashy and brown (occasionally purplish) colours, with a silver V-like mark, and a small dot in the middle of the disk; the ordinary strigæ are distinct; the basal one abbreviated, with a black dot adjacent to its extremity; the second striga is geminated, black, slender, and much waved; the anterior stigma is not very distinct; the outer one deeply emarginate on the outside; the third striga is also geminated and bidentate behind the silver character; and the apex of the wing bears a fourth dentate striga, and is of a dark ashy colour; the hind wings are dark grey-brown, with a broad deep margin. The moth appears in June and July, and is evidently an alpine and northern species, being rarely found further south than Yorkshire, although not rare on the moors in the northern parts of the country.

SPECIES 6.—PLUSIA GAMMA. PLATE LI., FIG. 7, 8.

SYNONYME.—*Phalæna Noctua Gamma*, Linnæus; Fabricius; Hübner; Treitschke; Donovan, 8, pl. 255, fig. 2; Albin, pl. 79, fig. e—h; Wilkes, pl. 69.

This species measures from 1¼ to 1⅝ inch in the expanse of the fore wings, which are very glossy, and of an ashy-grey, with dark rich brown markings, especially a large patch in the centre of the disk, on which is placed a silver spot, resembling the Greek letter gamma; the basal striga is slender, pale, and abbreviated, with a brown mark on each side, and terminating in a small black dot. The second striga is geminated and very much bent; the anterior stigma is very oblique, with a pale margin, and extending to the costa; the outer stigma also oblique, but in the opposite direction, surrounded by a very fine silvery line, and very deeply incised on the middle of the outer margin; the third striga is also very slender, irregular, and geminated; and the apical portion of the wing is much variegated, especially with a large pale patch at the anal angle; the hind wings are greyish-brown, with dark veins, and a broad margin of deep brown; the ciliæ of all the wings spotted with black. There is a curious white scale-like apparatus at the base of the abdomen on each side, which does not appear to have been noticed. The caterpillar is pale grey, with whitish and yellowish lines down the back and sides. It is polyphagous. The moth appears from May to October, and is one of the most abundant of the family. It is a widely-dispersed and very common insect, and is often to be seen hovering over flowers during the daytime, flying off with the greatest rapidity when approached.

SPECIES 7.—PLUSIA CIRCUMFLEXA. PLATE LII., FIG. 3, AND PLATE LI., FIG, 11.

SYNONYMES.—*Phal. Noctua circumflexa*, Linnæus; Treitschke; Haworth; Hübner; Stephens; Wood, Ind. Ent., pl. 16, fig. 404.
Noctua flexuosa, Donovan, vol. 12, pl. 412.

This species measures 1⅛ inch in the expanse of the fore wings, which are varied with brown and ashy, and marked with a somewhat silvery mark, which extends from the base nearly to the middle of the wing, resembling a letter V as written rather than printed; before and within the letter, the wings are ashy towards the costa; the two terminal strigæ are slender and pale, but distinct; and the stigmata have a very pale edging. Very rare; taken in Essex, by Drury, and near Hull, by Mr. Hewitson. The caterpillar is green, with a white lateral line edged above with brown, and with curved brown dorsal stripes.

SPECIES 8.—PLUSIA CHALSYTIS. PLATE XLII., FIG. 4.

SYNONYMES.—*Noctua Chalsytis*, Hübner; Treitschke; Godart, pl. 136, fig. 1; Duponchel; Boisduval; Curtis; Wood, Ind. Ent., pl. 54, fig. 52.
Noctua Chalcites, Borkhausen.
Noctua Bengalensis, Rossi.

This species has the wings finely varied with purple, rich brown, and golden yellow; a broad oblique central brown band, on which are placed two white or pale buff spots; behind which is a golden patch extending to the anal margin, and divided by the slender pale striga following the stigmata, which are not very distinct; the subapical striga is much angulated and preceded by an irregular brown bar. This species is a native of Italy and the south of France; and the only authority we have for its having occurred in this country is a specimen found by the late Mr. Standish, in an old frame containing moths arranged ornamentally.

SPECIES 9.—PLUSIA BILOBA, STEPHENS.

SYNONYME.—*Plusia biloba*, Stephens's Illustrations, Haust. 3, 104.

Expansion of the fore wings 1 inch and 5 lines. "Fuscous tinged with purplish; anterior wings of a rich purplish-brown, with darker undulated strigæ, nearly as in Pl. Gamma; at the base are several flexuous golden strigæ, and towards the costa, near the apex, is a mark of a similar hue resembling a reversed ϽϽ; in the centre of the wing is a large brilliant silvery patch, producing two lobes towards the costa; the rest of the wing and the posterior wings resemble those of Pl. Gamma," Steph. op. cit. A single specimen, now in Mr. Stephens's collection (from that of Mr. Swainson), of which the locality is unknown, is the only authority for this species, of which no figure has been yet published. Mr. H. Doubldday considers it to be North American.

SPECIES 10.—PLUSIA AURIFERA. PLATE LII., FIG. 5.

SYNONYME.—*Noctua aurifera*, Hübner; Treitschke; Duponchel; Stephens; Wood, Ind. Ent., pl. 10, fig. 403.

This species measures 1⅛ inch in the expanse of the fore wings, which are of a pale brown colour, with the stigmata and two basal strigæ slightly indicated, with a greenish gold patch in the middle of the wing somewhat lozenge-shaped, and which is dilated beyond the middle into a broad bar extending from the costa almost to the anal angle, followed by a slender yellowish subapical striga. Very rare, if indeed the true Pl. Aurifera be really indigenous; as the specimen in the British Museum, taken near Dover by the Rev. G. Lyon, has been considered as a singular variety of Pl. chrysitis, Pl. aurifera being described as a native of Spain, Portugal, the south of France, Teneriffe, etc. Another specimen, supposed to have been taken near London, was formerly in Mr. Ingpen's collection.

SPECIES 11.—PLUSIA CHRYSITIS. PLATE LII., FIG. 6, AND PLATE LI., FIG. 12.

SYNONYMES.—*Phalæna Noctua chrysitis*, Linnæus; Fabricius; Haworth; Hübner; Donovan, 4, pl. 137; Albin, pl. 71, fig. a—d; Harris, Aurelian, pl. 22, fig. a—c; Stephens; Wood, Ind. Ent., pl. 16, fig. 402.

This species measures from 1⅛ to 1½ inch in the expanse of the fore wings, which are of a pale brown, with two broad bars of greenish gold crossing the wings, the first occupying the space between the first and second ordinary strigæ, which are very slightly indicated by slender brown lines; and the second much broader between the third and the subapical strigæ, and with the edges slightly waved. The characteristic portion of the wing is narrow, especially behind, but bears the three stigmata; the first small and round, the second ear-shaped with a double-edge line, and the supplemental one small and rather oblong in form. The head and front of the body fulvous; the hind wings and abdomen brown: sometimes the golden bars are united by a longitudinal stripe behind the supplemental stigma. The caterpillar is green, with a white lateral line, and interrupted curved dorsal stripes. It feeds on the white Archangel, nettle, thistle, etc., and passes the winter in that state, being full-fed in July, when it forms a coarse brown web, in which it changes to a black chrysalis, and the moth appears in July and August. It is a very abundant insect.

SPECIES 12.—PLUSIA ORICHALCEA. PLATE LII., FIG. 7.

SYNONYMES.—*Noctua orichalcea*, Fabricius; Hübner; Trietschke; Haworth; Stephens; Wood, Ind. Ent., pl. 16, fig. 405; Harris, Exposition, pl. 6, fig. 4.

Noctua chrysa, Esper.

Phalæna Noctua ærifera, Sowerby, Brit. Misc., 59. t. 29.

This fine species measures about 1¾ inch in the expanse of the fore wings, which are of a chestnut-brown, with apical portion paler; the basal strigæ and stigmata scarcely discernible, and with a large quadrate patch of gold beyond the stigma towards the costa, through which the slender third striga passes; the head and front of the thorax is red, and the hind wings and abdomen reddish-brown, the former with a rather indistinct central striga. The caterpillar is green, with pale whitish dorsal and lateral stripes and spots. It feeds on Eupatorium cannabinum, and the moth appears from June to August. It is a rare insect, although widely dispersed, having been taken at Hethersett; Newbury, Berks; Glanville's Wootton; Crayford, Kent; Ashdown Forest; and near Manchester.

SPECIES 13.—PLUSIA BRACTEA. PLATE LII., FIG. 8.

SYNONYMES.—*Noctua bractea*, Fabricius; Hübner; Haworth; Sowerby, Brit. Miscell., 57, pl. 28; Stephens; Wood, Ind Ent., pl. 16, fig. 406.
Phal. Noct. Securis, Villers.

This species measures 1¾ inch in the expanse of the fore wings, which are varied with purplish-brown and greyish tints; the stigmata and strigæ indicated by darker markings; the middle of the wing on the inner margin marked with a large rich chestnut-brown patch, extending to the two ordinary stigmata, and bearing near the middle of the wing an angulated pale golden patch; apical portion of the wing beyond the dentate-subapical striga, pale brown; head and front of the thorax rich purplish-red; hind wings with a slight dusky fascia across the middle. This species is rare, but occurs in various parts of the north of England, Yorkshire, near Edinburgh, Isle of Bute, Derbyshire, Shropshire, near Birmingham, etc. Duponchel incorrectly states it to be common near London.

SPECIES 14.—PLUSIA FESTUCÆ. PLATE LI., FIG. 9, 10.

SYNONYME.—*Phalæna Noctua Festucæ*, Linnæus; Fabricius; Haworth; Donovan, vol. ii. pl. 46; Albin, pl. 84, fig. n—h; Wilkes, 8, pl. 17; Stephens; Wood, Ind. Ent., pl. 16, fig. 407.

This elegant insect measures nearly 1½ inch in the expanse of the fore wings, which are of a dark brown colour at the base within, along the costa, and on the apical margin; the other parts of the wing golden yellow, irrorated

more or less with fine red-brown scales; a very oblique dark striga from near the base of the wing within, to the basal angle of a large, silvery, diamond-shaped patch, near the middle of the wing, beyond which is another oval one towards the anal angle, and a narrower one towards the apical angle, edged behind by a dark oblique striga, which extends to the inner margin; the apical margin bearing two slender dark lines. The head and thorax in front golden brown, and the hind wings and abdomen grey-brown; the latter with pinkish cilia. The caterpillar is green, with dark dorsal and lateral lines, edged with white, and with yellow marks on each segment. It feeds on Festuca fluitans (fig. 13), Typha latifolia, and other aquatic plants; and the moth appears in June and August. It is not a very rare species, occurring in the marshes round London, as well as in the meres of Hunts and Cambs.

DESCRIPTION OF PLATE LIII.

INSECTS.—Fig. 1. Heliothis marginata (the bordered sallow).
" Fig. 2. Heliothis peltigera (the bordered straw). 3. The Caterpillar.
" Fig. 4. Heliothis Dipsacea (the marbled clover).
" Fig. 5. Heliothis scutosa (the spotted clover moth). 6. The Caterpillar.
" Fig. 7. Anarta Myrtilli (the beautiful yellow underwing).
" Fig. 8. Anarta cordigera (the small dark yellow underwing).
" Fig. 9. Anarta Vidua? (the dark yellow underwing.
" Fig. 10. Heliodes Heliaca (the small yellow underwing).
" Fig. 11. Acontia Luctuosa (the four-spotted.
" Fig. 12. Acontia aprica (the nun).
" Fig. 13. Acontia solaris (the pale shoulder).
" Fig. 14. Acontia caloris (the marbled beauty).
" Fig. 15. Hydrelia uncana (the silver hook).
" Fig. 16. Agrophila sulphuralis (the spotted sulphur).
" Fig. 17. Hydrelia Bankiana (the silver barred).
" Fig. 18. Erastria venustula (the rosy marbled).
" Fig. 19. Erastria minuta of Hübner.
" Fig. 20. Micra minuta of Haworth (the small marbled).
" Fig. 21. Micra ostrina (? purpurina) (the purple marbled).
" Fig. 22. Erastria apicosa (the blossom tip).
" Fig. 23. Erastria fuscula (the white spot marbled). 24. The Caterpillar.
" Fig. 25. Erastria albilinea (the white line marbled).

Heliothis.—Numbers 1, 2, and 4 are from the cabinet of Mr. Bentley. No. 5 (H. scutosa) is from a Continental specimen in the British Museum. *Anarta.*—Nos. 7 and 10 are from specimens from Mr. Bentley; 8, from a Continental specimen in the British Museum; and 9 (A. Vidua) from the specimen in the cabinet of Mr. H. Doubleday, one of the two specimens taken at the Shetland Isles. *Acontia.*—Fig. 12 (A. aprica) is from Hübner; figs. 11 and 13 (Luctuosa and Solaris) are from the cabinet of Mr. Bentley; and 14 (Caloris) is from a Continental specimen in the British Museum. *Erastria.*—All the insects figured in this genus, with the exception of E. minuta (No. 19) and E. ostrina (No. 21), the former from a specimen in the British Museum, and the latter from Mr. Curtis's figure, reduced to the natural size, are from the cabinet of Mr. Bentley.

Mr. E. Doubleday, who has kindly examined all the insects figured in the genus Erastria, and carefully compared them with other specimens in the Continental and British collections of the British Museum, has determined the insect called E. minuta in Mr. Bentley's collection (Haworth's specimen) to be a North American insect; the specimen in the British Museum (see fig. 20) being the true European minuta. Mr. Bentley's E. albilinea (Haworth's specimen) he has also proved to be a North American insect; and the insect figured by Mr. Curtis (No. 21, in this plate) as E. ostrina, he thinks is very probably the E. purpurina of Duponchel, etc. etc.

The caterpillars are from Hübner. H. N. H.

HELIOTHIS, OCHSENHEIMER.

The palpi in this well-marked genus are short, with the terminal joint distinct, but short and truncated at the tip; the antennæ are filiform in both sexes; the head and thorax are not crested; the fore wings without;

metallic markings; the hind ones bright-coloured, with a broad, dark, apical margin; the eyes are naked. The caterpillars elongated, submoniliform, with the head small, and capable of partial contraction within the first segment; the body with very distinct setigerous tubercles. They feed upon the flowers of low-growing herbs; and bury themselves underground in order to pass the chrysalis state.

SPECIES 1.—HELIOTHIS MARGINATA. PLATE LIII., FIG. 1.

SYNONYMES.—*Noctua marginata*, Fabricius; Treitschke; Donovan, 5, pl. 150, fig. 1; Haworth; Stephens; Wood, Ind. Ent., pl. 16, fig. 408.
Noctua rutila, Wien. Verz.; Hübner (variety).
Noctua umbra, Borkhausen.
Noctua umbrago, Esper.

This species measures about 1⅓ inch in the expanse of the fore wings, which are of an orange colour, varied with reddish and brown markings, and the strigæ are nearly equidistant; the basal one slightly curved; the second very much bidentated; the third angulated outwards, and extending between the two ordinary stigmata, which are distinguished only by their dusky, marginal lines; the fourth striga is more oblique, and beyond this the colour of the wing is deeper orange-red, with the subapical striga formed of brown lunules; the extreme margin with a dark line; the cilia bright purplish; the hind wings clay-coloured, with the base, a central lunule, and a marginal border of dark brown. Noctua rutilago is a variety, with the basal portion of the wing more saturated. The caterpillar feeds on Ononis spinosa, and is green, with reddish-brown shades, with a dusky dorsal and pale lateral lines. The moth is not very rare, frequenting the woods in the south of England, from Kent to Devonshire; and it has also been taken by Mr. Paget at Lowestoft.

SPECIES 2.—HELIOTHIS PELTIGERA. PLATE LIII., FIG. 2, 3.

SYNONYMES.—*Noctua peltigera*, Wien. Verz.; Hübner; Treitschke; Stephens; Wood, Ind. Ent., pl. 16, fig. 409.
Noctua scutigera, Borkhausen.
Noctua florentina, Esper.
Noctua barbara, Fabricius.
Noctua straminea, Donovan, 2, pl. 61 (incorrectly represented with a row of nine silvery spots on each of the fore wings).
Phytometra straminea, Haworth.

This species measures 1⅔ inch in the expanse of the fore wings, which are of a straw-clay colour, with the strigæ forming various slight cloudings; the ordinary stigmata small, and almost obliterated; the posterior one scarcely more than a brown spot; and between it and the apical margin is a double row of minute brown lunules; the apical margin with a row of minute black dots; a dusky patch towards the extremity of the costa; the hind wings whitish-clay, with a central lunule; veins and border brown, the latter bearing a whitish spot on the outside. This species is variable in the depth of its markings.

The caterpillar is very similar to that of the preceding species, and the perfect insect is a rare although a very widely-dispersed species; found from June to August, and frequenting clover-fields, hovering over the flowers in the sunshine.

SPECIES 3.—HELIOTHIS DIPSACEA. PLATE LIII., FIG. 4.

SYNONYME.—*Phalæna Noctua dipsacea*, Linnæus; Donovan, 10, pl. 327, fig. 3; Hübner; Haworth; Stephens; Wood, Ind. Ent., pl. 16, fig. 410.

This species measures 1¼ inch in the expanse of the fore wings, which are of a pale brown colour, with numerous small dusky dots scattered over the base and apical portion of the wing, indicating the place of the strigæ and anterior stigma; across the middle of the wing runs a dark, rich, brown bar, extending to the costa; the apical margin with a row of dark dots; the hind wings whitish-buff, with a large patch in the centre (extending to the base on the outside) and a broad marginal band, in which is a pale spot, in the middle of the outer edge, of dark brown. Beneath, the fore wings are nearly white, with two large black spots and a bar formed of confluent black dots. The caterpillar is red, with the head ash-coloured, and interrupted white lines

on the body. It feeds on various plants, as the dock, plantain, teazle, scabious, etc. It appears from June to August, and is a rare but widely-dispersed species, chiefly occurring in the south of England, but also taken in Norfolk and Suffolk.

SPECIES 4.—HELIOTHIS SCUTOSA. PLATE LIII., FIG. 5, 6.

SYNONYMES.—*Noctua scutosa*, Hübner; Fabricius; Curtis, Brit., Ent., pl. 595; Wood, Ind. Ent., fig. 1672.

This species has the fore wings dark brown, with the veins and a subapical striga ochreous-white; the disk of the wing with three large brown spots edged with black, representing the three stigmata, the anterior one preceded and followed by ochre-white spots; the apical margin with a row of black dots. The hind wings whitish-ochre, with dark veins, and a blackish central spot and marginal border, in which are two round ochreous spots on the outside towards the middle. The caterpillar is green, with black setigerous tubercles and black lines on the back and sides; it feeds on Artemisia campestris, and the moth has occurred "on the banks of the river Caldew, a little below the village of Dalston, in July last;" also, on the coast not far from Skinburness, in Cumberland.

ANARTA, OCHSENHEIMER.

This genus has the terminal joint of the palpi so short as to be invisible except by denuding them; the antennæ are alike in both sexes, and filiform; the eyes pubescent, the thorax not crested, the fore wings lanceolate, the hind ones pale with a dark border. The caterpillars have sixteen feet; they are smooth and naked, with a small head; they feed on low plants. The chrysalides are enclosed in cocoons of silk mixed with grains of earth. The perfect insects are of small size; they fly by day in the sunshine.

SPECIES 1.—ANARTA MYRTILLI. PLATE LIII., FIG. 7.

SYNONYMES.—*Phalæna Noctua Myrtilli*, Linnæus; Fabricius; Haworth; Donovan, 7, pl. 231; Harris, Expos., pl. 4, fig. *e*; Curtis, Brit. Ent., pl. 145; Stephens; Wood, Ind. Ent., pl. 16, fig. 411. *Noctua albirena*, Haworth (variety).

This species measures rather less than an inch in the expanse of the fore wings, which are of a red-brown colour, with fulvous and greyish-white slender undulating strigæ, and with an irregular-shaped white spot in the middle, and an obscure kidney-shaped posterior stigma; the cilia alternately spotted with white and brown; hind wings pale fulvous, with a broad black margin extending all round the wing; the cilia luteous. It varies considerably in the clearness of the pale markings and in the brilliancy of the ground colour of the wings, which are sometimes brown, with pale markings (*N. albirena*, Haw.) The caterpillar is green and naked, with a greyish-coloured head, and with numerous minute white and yellow spots, with a dusky dorsal line, and a white line on each side above the feet. It feeds on heath and whortleberry, and the moth appears in June and July; it is a very lively insect, flying over heathy places in the sunshine. It is far from uncommon, and is a widely-dispersed species.

SPECIES 2.—ANARTA CORDIGERA. PLATE LIII., FIG. 8.

SYNONYMES.—*Noctua cordigera*, Thunberg, Esper; Ochsenheimer; Duponchel; Stephens; Curtis; Wood, Ind. Ent., pl. 52, fig. 1670. *Noctua albirena*, Hübner.

This species has the fore wings blackish-brown, with a large kidney-shaped whitish patch in the middle, having a dark dash in front of it extending towards the base of the wing; the ordinary strigæ are indistinct and dark, the subapical one being most discernible; the hind wings are luteous, with a blackish border narrower than in the preceding species. A specimen from Scotland is in Mr. Curtis's collection.

SPECIES 3.—ANARTA VIDUA. PLATE LIII., FIG. 9.

SYNONYMES.—*Noctua vidua*, Hübner; Treitschke; Duponchel; Curtis's Guide; Wood, Ind. Ent., pl. 17, fig. 413.
Anarta melanopa, Thunberg; Boisduval.

This species measures about an inch in the expanse of the fore wings, which are dull greyish-brown, with the strigæ darker, undulating and dentated, and the stigmata distinct, with dark edges; the hind wings are blackish-brown, with the base paler, and with a discoidal dark lunule; the cilia pale, and the body rather slender. Specimens from the north of Scotland are in Mr. Curtis's and Mr. H. Doubleday's cabinets.

HELIODES, GUENÉE. ANARTA, P. STEPHENS.

The antennæ are perfectly setaceous in both sexes; the palpi very minute and scarcely discernible; the abdomen slender; the fore wings large and triangular, without distinct markings, and the hind ones broad; when at rest they are extended as in the Geometridæ. The caterpillars are short, naked, with a small head, and longitudinally striped. They feed on low plants.

SPECIES 1.—HELIODES HELIACA. PLATE LIII., FIG. 10.

SYNONYMES.—*Noctua heliaca*, Wien. Verz.; Hübner; Ochsenheimer; Stephens; Wood, Ind. Ent., pl. 17, fig. 414; Harris, Aurelian, pl. 33, fig. o.
Noctua arbuti, Fabricius; Haworth; Donovan, 10, pl. 343, f. 3; Curtis.
Noctua fasciola, Esper.
Phalæna domestica, Hufnagle.

This pretty little insect measures about $\frac{3}{4}$ of an inch in the expanse of the wings, which are brown, thickly irrorated with fulvous, red and dusky atoms, a darker shade crossing them about the middle, followed by a paler transverse shade, then a dusky bar terminated irregularly by the pale subapical undulated striga, which is almost obsolete; the hind wings are black, with a bar of bright orange running across the middle; the cilia of the fore wings is alternately dark and light, that of the hind wings entirely pale luteous.

This is rather a common species, and is widely dispersed, flying in the afternoon sunbeams at the end of May and June, in meadows and over grassy places.

ACONTIA, OCHSENHEIMER.

This genus has the antennæ simple in both sexes, the palpi curved upwards higher than the eyes, slender, and with the terminal joint distinct and acute; the abdomen rather slender, and tufted in the males; the wings are prettily variegated, and the cilia are party-coloured; they fly by day. The caterpillars are elongated, attenuated behind, slightly setigerous, with only *two pairs of membranous pro-legs*, resembling those of Euclidia.

SPECIES 1.—ACONTIA LUCTUOSA. PLATE LIII., FIG. 11.

SYNONYMES.—*Noctua luctuosa*, Wien. Verz.; Hübner; Treitschke; Boisduval; Haworth; Stephens; Wood, Ind. Ent., pl. 17, fig. 415.
Noctua Italica, Fabricius; Devilliers.
Noctua leucomelas, Fuessly.

This species measures from 1 to $1\frac{1}{6}$ inch in the expanse of the fore wings, which are of a dark blackish-brown, with slender undulated black strigæ; the anterior stigma small and round; in the place of the outer stigma is a large square rosy white spot extending to the costa, where are two small dark dots; at the anal angle is a pale patch, from which runs a series of black arches to the costa, edged with grey on the outside, and an interrupted row of reddish marginal dots; the cilia white, with the middle portion black; the hind wings blackish, with a

broad greenish-white central bar (bearing a strong tooth in the middle from the base), and two small pale spots on the margin. The perfect insect is found in clover-fields in June and August; at the beginning of which latter month I have taken it flying in the afternoon sunshine, near Wiesbaden. It is rather uncommon, but occurs in Kent, Surrey, and Hertfordshire.

SPECIES 2.—ACONTIA APRICA. PLATE LIII., FIG. 12.

SYNONYMS.—*Noctua aprica*, Hübner; Treitschke; Stephens; Wood, pl. 52, fig. 1671.
Noctua albo-ater, Haworth.

Size of A. luctuosa; fore wings white at the base, with two black costal spots; apical portion blackish, with deeper chocolate-coloured shades; the subapical striga slender, white, and very tortuous; hind wings and body white, the former with a slightly dusky margin; cilia of fore wings broad, and spotted with brown and white; of the hind wings whitish. A single specimen, of which the habitat is unknown, was in the collection of Mr. Tinley more than half a century ago. Boisduval gives the south of Italy as its locality, and Mr. H. Doubleday omits it from the list of British Noctuæ.

SPECIES 3.—ACONTIA SOLARIS. PLATE LIII., FIG. 13.

SYNONYMES.—*Noctua solaris*, Wien. Verz.; Hübner; Treitschke; Godart; Stephens; Wood, Ind. Ent., pl. 17, fig. 416.
Noctua albicollis, Fabricius.
Noctua rupicola, Borkhausen.
Phalæna lucida, Hufnagle.

This species measures about 1½ inch in the expanse of the fore wings, which are white at the base, with a black dot towards the costa, and terminated before the middle of the wing by a rather broad deeply angulated bar, followed on the costa by a large pale whitish patch, and a slender waved streak on the opposite part of the inner margin; the anal angle white, with several ashy-grey clouds or spots; the apex rather of a leaden grey, with a row of minute black dots; the reniform stigma somewhat like the figure 8; cilia brown, that portion next the anal angle white; hind wings white, with a broad brown margin; cilia white. Several specimens taken near Dover and London, about twenty years ago, in June. The caterpillar feeds on trefoil, dandelion, etc. The moth is very common near Paris, appearing in May and August. It flies in the hottest part of the day in dry places, where Eryngium campestre grows.

SPECIES 4.—ACONTIA CALORIS. PLATE LIII., FIG. 14.

SYNONYME.—*Noctua Caloris*, Hübner; Treitschke; Curtis; Stephens; Wood, Ind. Ent., pl. 17, fig. 417.

This species measures about 1½ inch in the expanse of the fore wings, the basal portion of which is white, with several bluish-grey strigæ; the remainder of the wing varied with grey, blue, and brown, having a large white patch on the costa (enclosing a small dark twig); about the middle of the wing is a dark dot behind the bilobed grey outer stigma; the submarginal stigma is slender, pale, and very much waved, especially towards the anal angle, the margin itself with a row of black dots; the cilia brown in front, but with the hinder portion white; hind wings whitish, with a broad dusky margin. A single specimen from Plastead's collection is now in Mr. Curtis's cabinet, and is supposed to have been captured near London many years ago. Boisduval gives it as a native of Greece; and Mr. H. Doubleday omits it from the list of British Noctuæ.

DESCRIPTION OF PLATE LIV.

INSECTS.—Fig. 1. Euphasia Catena (the Brixton beauty).
„ Fig. 2. Phytometra ænea (the small purple barred).
„ Fig. 3. Acosmetia lutescens (the reddish buff).
„ Fig. 4. Acosmetia Caliginosa (the dingy).
„ Fig. 5. Acosmetia rufa (the small rufous).
„ Fig. 6. Acosmetia lineola (the lineated rufous).
„ Fig. 7. Acosmetia arcuosa (the small dotted buff).
„ Fig. 8. Stilbia anomalata (the anomalous). 9. The female.
„ Fig. 10. Ophiusa lusoria (the black neck). 11. The Caterpillar.
„ Fig. 12. Acosmetia Morrisii.

Euphasia Catena is from the fig. in Mr. Curtis's work; all the others, with the exception of No. 12, are from the cabinet of Mr. Bentley.

I have not figured C. ludicra, formerly in the collection of Mr. Swainson, as it is probably not British. Catephia leucomelas and Catephia trifasciata I have also omitted, as Mr. E. Doubleday has no doubt that the former is a North American insect, and that the latter was introduced by some mistake of Mr. Kirby's, who thinks he picked up one dead in his garden. H. N. H.

EUPHASIA, STEPHENS. ACONTIA, p. CURTIS. DESMOPHORA, STEPH. CAT.

Mr. Stephens has separated the type of this genus from Acontia, on account of its elongate-lanceolate fore wings, which are very glossy and rounded behind; the posterior wings rounded, the head broad, palpi short, eyes naked, and body rather elongated.

SPECIES 1.—EUPHASIA CATENA. PLATE LIV., FIG. 1.

SYNONYMES.—*Phalæna catena*, Sowerby, Brit. Misc., 1, pl. 14, Haworth; Curtis, Brit. Ent., 276; Stephens; Wood, Ind. Ent., pl. 17, fig. 424 (Desmophora c.)
Desmophora elegans, Stephens's Cat.

This species measures 1⅓ inch in the expansion of the fore wings, which are white, with a brown and grey spot, crossed by three pale lines, near the base and towards the costa, a triangular spot of the same colours in the middle of the costa; and the apical margin is lilac, yellow inwardly, with a row of white dots, with lilac centres, forming a chain; cilia yellowish-lilac; hind wings white, with the margin slightly brown on the outer angle. A single specimen, taken by Mr. Plastead, at Brixton, about forty years since, and now in Mr. Curtis's cabinet, is the only authority for the introduction of this fine insect into our indigenous lists. Boisduval regards it as a native of America, and as probably belonging to his genus Eudryas. It is omitted by Mr. H. Doubleday from his list of British Noctuæ.

ERASTRIA, OCHSENHEIMER, BDV., GUENÉE. ACOSMETIA, I., CURTIS.

This genus has the antennæ setaceous and short; the palpi are elevated, extending beyond the head; the terminal joint long and naked; the thorax is not crested; the abdomen crested in both sexes; the wings broad, the fore ones with distinct lines and spots. The caterpillars are semi-loopers, with fourteen feet; they are elongated and longitudinally striped, and the chrysalides are enclosed in cocoons amongst leaves or moss.

SPECIES 1.—ERASTRIA FUSCULA. PLATE LIII., FIG. 23, 24.

SYNONYMES.—*Noctua fuscula*, Wien. Verz.; Och.; Treitschke; Hübner; Curtis, Brit. Ent., pl. 355; Stephens; Wood, Ind. Ent., pl. 17, fig. 426.
Phytometra fusca, Haworth.
Noctua polygramma, Esper.
Noctua præduncula, Borkhausen.

This species measures 1 inch in the expanse of the fore wings, which are of a brown colour, varied with darker and lighter markings; on the costa are several pale dots; the ordinary strigæ and stigmata are distinct, with dark edge lines; between the stigmata runs a black streak; at the anal angle is a large white patch,

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extending towards the outer angle, where it becomes attenuated to a fine line; it bears several slight cloudings, forming a subapical flexuous striga, and a minute row of dark dots on the margin; the hind wings are pale grey-brown. The caterpillar is pale buff-coloured, with a dark dorsal line, and several pale reddish lateral ones. It feeds on the common bramble, and the moth appears in June. It is not an uncommon species in the woods near London, and other parts of the south of England.

SPECIES 2.—ERASTRIA ALBIDILINEA. PLATE LIII., FIG. 25.

SYNONYME.—*Phytometra albidilinea*, Haworth; Stephens; Wood, Ind. Ent., pl. 17, fig. 427.

This species measures 1 inch in expanse, and is very closely allied to the preceding insect, of which it is regarded as a probable variety by Curtis and Stephens, with the markings suffused, the pale patch at the anal angle of the fore wings being obliterated, and the subapical pale flexuous striga very rudimental. It is captured in company with the preceding species, according to Mr. Stephens, but very rarely.

SPECIES 3.—ERASTRIA APICOSA. PLATE LIII., FIG. 12.

SYNONYME.—*Phytometra apicosa*, Haworth; Stephens (Erastria a.); Wood, Ind. Ent., pl. 17, fig. 425.

This species measures 1 inch in the expanse of the fore wings, which are of a shining blackish colour from the base to beyond the middle, with the apical margin and outer stigmata purplish; the latter oblique, and connected with the pale space following the third striga, which is slender, black, and much curved; the subapical one is pale and tortuous; the costa, towards the apex, with several small pale dots; hind wings brown, with a darker central dot. A few specimens only of this species are accorded as British, but their habitat is unknown. It is omitted by Mr. Doubleday from the list of native Noctuæ.

SPECIES 4.—ERASTRIA VENUSTULA. PLATE LIII., FIG. 18.

SYNONYME.—*Noctua venustula*, Hübner; Haworth; Stephens; Wood, Ind. Ent., pl. 17, fig. 422.

This species measures about $\frac{3}{4}$ of an inch in expanse of the fore wings, which are whitish-buff, with the middle of the disk and the apical margin brown, with a central rosy dash and a black dot; the strigæ are rather indistinct, the subapical one terminating in a brown patch on the costa; hind wings pale brown, with rosy cilia. The caterpillar is reddish-brown, with two bright orange belts, a dusky dorsal line, and curved stripes on the sides. The perfect insect appears in June. It is extremely rare, said to have been taken formerly in Epping Forest.

HYDRELIA, GUENÉE. ERASTRIA, p., CURTIS, STEPHENS.

This genus differs from the preceding by having the abdomen not tufted along the back; the palpi are elevated, with the terminal joint short and scarcely visible; the wings with strongly-marked stripes, on which the strigæ are obliterated. The caterpillars are of bright colours, with the line above the spiracles only distinct; they have fourteen feet, but the fifth pair is short and unfitted for walking. They feed upon plants in damp situations.

SPECIES 1.—HYDRELIA UNCANA. PLATE LIII., FIG. 15.

SYNONYMES.—*Phalæna Geometra uncana*, Linnæus; Ochsenheimer; Stephens; Wood, Ind. Ent., pl. 17, fig. 420; Panzer, F. I. G., 7, 18. | *Phytometra unca*, Wien. Verz; Esper; Haworth; Hübner; Curtis (Erastria a.)

This species is about 1 inch in the expanse of the fore wings, which are of a brown colour, with the costal margin broadly white, with a buff tinge, the extreme costa being more dusky; the stigmata are snowy white,

with the middle livid, forming a large pale oblong patch, placed obliquely, and branching from the middle of the pale costal margin, and sometimes emitting a twig towards the posterior margin; an oblique plain white stripe runs nearly parallel with the apical margin, but does not extend to the costa, bearing a slender marginal brown or livid line; hind wings brown, with brownish cilia. The caterpillar is green, with a pale line on each side. It feeds on Carices; and the moth is taken in June, August, and September, in the marshes and fens of Huntingdonshire, Norfolk, Hampshire, and Devonshire, where it is not uncommon.

SPECIES 2.—HYDRELIA BANKIANA. PLATE LIII., FIG. 17.

SYNONYMES.—*Pyralis Bankiana*, Fabricius; Haworth; Stephens; Wood, Ind, Ent., pl. 17, fig. 421.
Noctua Olivea, Hübner.
Erastria argentula, Borkhausen; Esper; Ochsenheimer; Curtis; Guénée; Doubleday.
Tortrix olivana, Wien. Verz. (teste Fabr. Mant. ins., 2, 224).

This species measures about $\frac{5}{8}$ of an inch in the expanse of the fore wings, which are of an olive-green colour, with a small white costal spot at the base, two white fasciæ, one crossing the wing obliquely before the middle, and the second extending from the middle of the costa to the anal angle, and elbowed inwardly in the middle; on the extremity of the costa is a small pale oblique lineola, and the apical margin is white; hind wings whitish-grey, irrorated with olive scales. The caterpillar is green, with a white line on each side. The perfect insect appears about the beginning of July. Originally described in 1775,* by Fabricius, in the Syst. Entomol., p. 645, as a native of this country; but Mr. Swainson alone possessed a specimen, until about 1825, when Mr. Haworth captured a considerable number at the end of June, amongst reeds and rushes in a boggy situation, in Norfolk.

AGROPHILA GUÉNÉE (BOISDUVAL, PARS).

The antennæ are of moderate length and setaceous in both sexes; the palpi rather short, compressed, with the terminal joint but slightly distinct, and conical; the abdomen not tufted; the wings rather oblong; the spiral tongue long; the caterpillars with *only* 12 *feet*, rather thickened in front; the head small; the chrysalides are enclosed in cocoons of earth and silk buried at a little depth under ground; the habits of the typical species, both in the larva and perfect state, as well as the structure of the latter, render its separation necessary from the other Agrophilæ of Boisduval, which M. Guénée has formed into the genus Hydrelia adopted above. There is a second species from the east of Europe entering into the same genus as our British species, A. sulphuralis.

SPECIES 1.—AGROPHILA SULPHURALIS. PLATE LIII., FIG. 16.

SYNONYMES.—*Phalæna Pyralis sulphuralis*, Linnæus; Panzer, F. I. G., 8, 18; Donovan, vol. 10, pl. 339, fig. 1; Stephens; Wood, Ind. Ent., pl. 17, fig. 419.
Noctua Sulphurea, Wien. Verz.; Hübner; Ochsenheimer; Haworth.
Bonbyx lugubris, Fabricius.
Noctua arabica, Borkhausen.
Pyralis trabealis, Villiers.

This pretty species is rather less than 1 inch in the expanse of the fore wings, which are sulphur-coloured, with nine black spots and two thick bars of white, of which three spots are upon the costa, two on the disk, preceding the bar, which runs from the base parallel with the hind margin, which is also black, extending nearly to the anal angle, when it is bent into an oblique bar, which runs nearly to the apex of the costa; the apical margin has four black spots; these are sometimes confluent, forming an irregular subapical bar; the strigæ and the other spots are also sometimes more or less confluent together; the oblique part of the black bar is silvery in fine specimens. The cilia are black and white; the hind wings brown. The caterpillar is grass-green, spotted with white, and with a dark dorsal line and yellow lateral streaks. It feeds on the small convolvulus growing in dry places,

* The name given to this species by Fabricius must therefore prevail, from its long priority over that of Borkhausen.

holding its body much bent, and standing only on its pro-legs; the moth is very rare; it flies about thistles in blossom, growing in hot dry places, in June and July, and has occurred in Battersea Fields and several parts of Kent.

MICRA, Guenée. (ERASTRIA, p., Stephens, Curtis.)

The antennæ are short and filiform in both sexes; the palpi are elevated, with the terminal joint distinct; the thorax and abdomen not crested; the wings with deep cilia, acute at the tip, and with distinct lines. The caterpillars have only twelve feet; they are thick and setigerous, with the extremities attenuated; they feed on low-growing plants, and the chrysalides are enclosed in cocoons spun amongst leaves or moss. The perfect insects fly during the day in dry and exposed situations.

SPECIES 1.—MICRA HAWORTHANA. Plate LIII., Fig. 30.

Synonyme.—*Phytometra minuta*, Haworth (but not of Hübner, Treitschke, etc.); Stephens; Wood, Ind. Ent., pl. 17, fig. 423.

This species measures about ¾ of an inch in the expanse of the fore wings, which are of a creamy white, varied with brown, lead-coloured, luteous, red and olivaceous tints, the basal portion being white, followed by a broad bar arising from two spots, one before and the other beyond the middle of the costa, and which unite behind the stigmata, being much darker behind than towards the costa; the subapical striga is pale and deeply angulated towards the anal angle, terminating towards the costa in a dark dot; and the apical margin has a row of small black dots resting upon an irregular olivaceous yellow cloud; the hind wings ashy-white, with the margin darker. This species has not been taken in this country for many years; few specimens only of it occurring in cabinets, whence it has been regarded as a doubtful species. As there are, however, eight or nine continental species of this group, this species may possibly be identical with one of them. It differs from M. minuta of Hübner, with which Haworth united it, as may be seen by comparing our figure with that of Hübner, copied in our plate 53, fig. 19.

SPECIES 2.—MICRA OSTRINA. Plate LIII., Fig. 21.

Synonyme.—*Noctua ostrina*, Hübner; Curtis, Brit. Ent., pl. 140; Stephens; Wood, Ind. Ent., pl. 17, fig. 418.

This species measures ¾ inch in the expanse of the fore wings, which are slightly cinereous towards the base, with a ferruginous line in the middle; a dull, irregular, orange space across the middle, in which is a dusky circle, and followed by a lilac fascia, darker externally, where is a much-dentated, white striga, emitting black dashes, directed inwardly; the costa with four white dots; the apical margin luteous, and the cilia long and pale; the hind wing whitish-ochre, with the margin dusky. Taken in June, 1825, in a dry lane near Bideford, Devon, by the late Captain Blomer. Boisduval gives it as distinct from M. purpurina, and states that it appears in the spring as well as the summer, and that the æstival specimens vary considerably.

PHYTOMETRA, Stephens (Haworth, sect. 3, pars). ANTHOPHILA, Ochsenheimer.

Mr. Haworth, with great justice, separated the great group of Noctuideous moths into three sections or genera as he named them. 1st, Noctua, containing the great mass of the group; 2nd, Phytometra,* or the day half-loopers, containing those species with a rather thick body; the wings with indistinct stigmata, and the flight diurnal, as well as vespertinal, and of which the caterpillars have only twelve feet; and, 3rd, Hemigeometra, the

* Misnumbered by him 10 instead of 11.

half-loopers, or those with the body slender; the wings without distinct stigmata; the flight occasionally diurnal; the caterpillars half-loopers, but with sixteen feet, and the cocoons never subterranean.

The Phytometræ are divided by him into three sections:—

1st, Metallicæ, or the genus Plusia of modern authors. (See Plates 51 and 52.)

2nd, Graciles, with slender bodies; and

3rd, Solares, with more robust bodies, and variegated wings, } comprised in our Plates 53 and 54;

whilst his Hemigeometræ occupy our Plates 55 and 56.

The name Phytometra has been restricted to the pretty little insects next described by Mr. Stephens, who has entirely rejected Ochsenheimer's name, Anthophila, which has been used in other departments of Entomology. Guénée and Boisduval, however, still retain the latter name, Guénée, giving it to other insects, and using Phytometra for our species, which is distinguished from all the allied species by its long, ascending, compressed palpi with a long, ensiform, terminal joint; the antennæ are slender and setaceous; the thorax and abdomen not crested; the fore wings are somewhat triangular, acute at the tip, and without stigmata; the perfect insect flies by day in heathy places in July and August.

SPECIES 1.—PHYTOMETRA ÆNEA. Plate LIV., Fig. 2.

Synonymes.—*Noctua ænea*, Wien. Verz.; Hübner; Haworth; Stephens; Wood, Ind. Ent., pl. 17, fig. 428.
Noctua latruncula, Esper.
Noctua olivacea, Vieweg.
Noctua laccata, Scopoli.

This species measures ¾ inch in the expanse of the fore wings, which are brown, olive-brown, or pitchy-brown, with an oblique purple fascia beyond the middle of the wing, and a broad apical margin of the same colour, separated from each other by an undulating darker striga; hind wings olive-brown, with the margin purplish. This species is very variable in the colour of the fore wings, which are occasionally destitute of the subundulated fascia, or purple colour. It is not uncommon on heaths in the south of England.

ACOSMETIA, Stephens.

The species of this group have the body long and slender; the palpi short, with the terminal joint short and obtuse; the antennæ slightly pectinated in the males; the head slightly tufted; the thorax not crested; the fore wings elongate, triangular, and destitute of markings.

SPECIES 1.—ACOSMETIA LUTESCENS. Plate LIV., Fig. 3.

Synonyme.—*Phytometra lutescens*, Haworth; Stephens; Wood, Ind. Ent., pl. 17, fig. 429.

This species measures 1⅛ inch in the expanse of the fore wings, which are of a pale reddish luteous, nearly unicolorous, and destitute of markings, but rather redder on the costa; the hind wings brownish; the cilia of all the wings rufescent; those of the fore wings darker. Very rare. Taken at Lyndhurst, Hampshire, in July.

SPECIES 2.—ACOSMETIA CALIGINOSA. Plate LIV., Fig. 4.

Synonymes.—*Noctua caliginosa*, Hübner; Haworth; Stephens; Wood, Ind. Ent., pl. 17, fig. 430.
Anthophila infida, Ochsenheimer.

This species measures rather more than an inch in the expanse of the fore wings, which are greyish or reddish-brown, with two more or less obscure strigæ across the middle of the wings; the second more curved, and indicated by dots on the veins; also a paler, waved, but almost obliterated subapical striga; hind wings grey, darker towards the anal angle. Very rare. Taken in the New Forest in June.

SPECIES 3.—ACOSMETIA RUFA PLATE LIV., FIG. 5.

SYNONYMES.—*Phytometra rufa*, Haworth; Stephens; Wood, Ind. Ent., pl. 17, fig. 431.
Acosmetia rufula, Stephens, Cat.; Curtis.

This species measures rather less than an inch in the expansion of the fore wings, which are rather more oblong than in the preceding species, and of an uniform dull red colour, as are also the cilia; the hind wings with their cilia paler, and with a row of small dots across the middle; the head between the antennæ white; the body slender. Rare. Found near Whittlesea Mere, and in Norfolk.

SPECIES 4.—ACOSMETIA LINEOLA. PLATE LIV., FIG. 6.

SYNONYME.—*Acosmetia lineola*, Stephens; Wood, Ind. Ent., pl. 17, fig. 433.

Somewhat resembling the last, but the fore wings shorter and reddish-grey, with a longitudinal brown line at the base (occasionally branching like a ⊲) and a subapical striga of brown dots; the veins at the apex dusky, cilia reddish; hind wings paler, with a slightly-marked striga of small obscure dots near the middle. Rare. Taken on the borders of Cambridgeshire and Norfolk.

SPECIES 5.—ACOSMETIA ARCUOSA. PLATE LIV., FIG. 7.

SYNONYME.—*Phytometra arcuosa*, Haworth; Stephens; Wood, Ind. Ent., pl. 17, fig. 433.

This species measures 1 inch or rather more in the expanse of the fore wings, which are dirty whitish clay-coloured; the costa with several brown dots, of which the last towards the apex is the largest, and with two strigæ of minute brown dots, the first straight and preceding, and the second curved and behind the middle of the wing; between these strigæ in the middle of the wing is a single brown dot, and towards the apex an undulated pale striga; the cilia pale; the hind wings with their cilia brownish; the strigæ of dots vary in intensity in different specimens. Found in various places round London, but uncommon.

SPECIES 6.—ACOSMETIA MORRISII.

SYNONYME.—*Acosmetia Morrisii*, Dale, in the "Naturalist," vol. ii. p. 88, and Errata.

This species measures about an inch in the expanse of the fore wings, which, as well as the hind wings and body, are entirely of a pale whitish-straw colour; the costa of the fore wings slightly brownish. Named by Mr. Dale after the Rev. F. T. Morris, who discovered it. It has been taken several times on the East Sea Cliff, Charmouth, Dorset, at the beginning of July. We are indebted to Beverley R. Morris, Esq., for the loan of two specimens, differing somewhat in size.

SCOPELOPUS INOPS, Stephens (Phytometra scopulæpes, Haworth), is omitted, as being a probable native of Georgia, in North America. It is remarkable on account of its hind legs producing brush-like fascicles of long hairs; the fore wings are clay-coloured, with a slender pyramidal brownish fascia near the apical margin of the wings. A specimen was described by Mr. Haworth as being in Dr. Leach's collection, from the Duchess of Portland's English cabinet.

STILBIA, STEPHENS.

The fore wings in this genus fold round the body, like those of the Lithosiæ, and are very shining as well as stigmatiferous; they are weak, and comparatively of large size to the body, which is slender and linear; the palpi nearly horizontal, with the terminal joint very small; the antennæ slender and setaceous; the thorax not crested; and the abdomen not tufted down the back. The caterpillar and transformations are not known.

SPECIES 1.—STILBIA ANOMALATA. PLATE LIV., FIG. 8, 9.

SYNONYMES.—*Phalæna anomalata*, Haworth, in Ent. Trans., (old series, 1812), vol. i. p. 336; Stephens; Curtis, Brit. Ent., pl. 631; Wood, Ind. Ent., pl. 17, fig. 435.

Geometra hybridata, Hübner.
Caradrina stagnicola, Treitschke (nec Bdv. and Duponchel).
Ophiusa Lathyri, Boisduval.

This species measures from 1⅛ to 1½ inch in the expanse of the fore wings, which are silky ashy-brown; the costa darkest, with several small oblique pale markings near the tip; a pale dentated striga before, and a second behind the middle of the wing, edged with a dusky line, and between them the two ordinary stigmata placed obliquely to each other, with pale centres and edges; a pale, slender, subapical, irregular striga, and a marginal row of small black oblong dots; the hind wings pale ochreous, with the margin darker; the markings vary in intensity in different individuals. The female differs in being rather smaller than the male, with the fore wings of an uniform dark livid brown, the markings being almost obsolete; the hind wings whitish, irrorated with brown, especially along the margin. Taken in August and September, in many localities of England, Wales, and Scotland, but by no means common.

OPHIUSA, OCHSENHEIMER (PARS). TOXOCAMPA, GUENÉE.

This curious genus has the palpi divergent, prominent, and with the terminal joint small but distinct in our typical British species. The head with a frontal tuft; the body slender, tufted at the tip in the males; the wings when closed, forming a triangle, and very little deflexed; the thorax and abdomen are not tufted. The caterpillars are sixteen-footed, and are half-loopers; they feed upon low-growing leguminous plants.

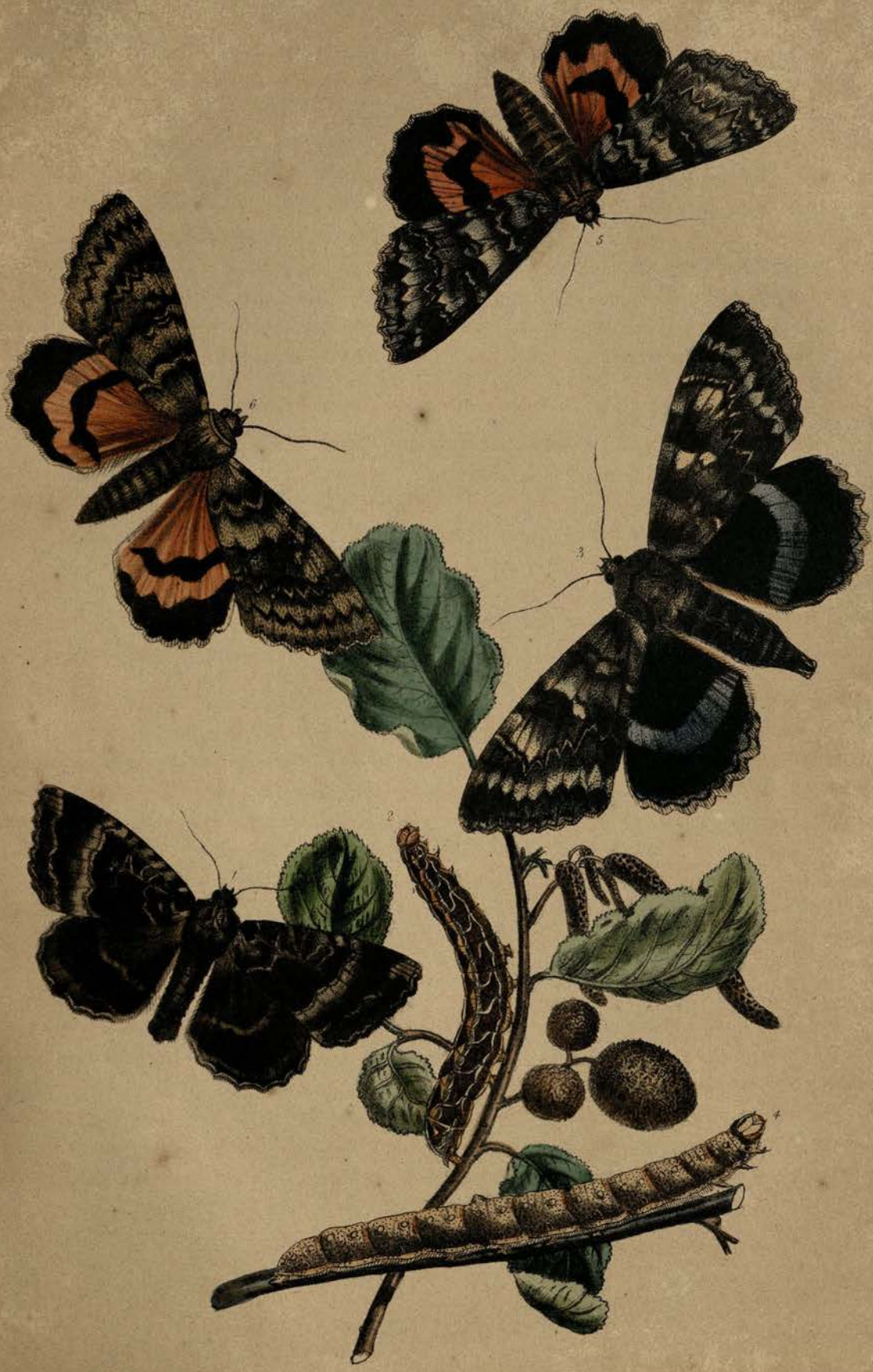
SPECIES 1.—OPHIUSA LUSORIA. PLATE LIV., FIG. 10, 11.

SYNONYME.—*Phalæna Bombyx lusoria*, Linnæus; Hübner; Curtis, Brit. Ent., pl. 475; Donovan, 10, pl. 354, fig. 2; Stephens; Wood, Ind. Ent., pl. 17, fig. 434.

This species measures about 1⅔ inch in the expanse of the fore wings, which are of a pale purplish-grey colour, thickly irrorated with darker transverse lineolæ, with one or two very dark brown dots, in place of the anterior stigma, and a larger conical spot, accompanied by two dots at its outer lower angle, of the same colour, in the place of the outer stigma; a brown cloud runs parallel with the apical margin, in which is the rudiment of a very pale undulating striga; the margin with a row of small dark dots; the hind wings are ochreous and freckled, with the margin slightly darker. There is much difference in the tinge of different specimens. The body is pale luteous, with the collar black-brown. The caterpillar is grey on the sides, the back striped longitudinally with white, black, and fulvous, and a black line above the feet; it feeds on Astragalus glycyphyllos. The moth occurs in moist places, and in woods, and is very widely dispersed, being found in July and August, in the woods round London, and in Suffolk, Yorkshire, Cambridge, "Teignmouth."—*W. R. H. Jordan, Esq.*

Obs.—The five following species have been introduced into our Lists of English Moths; but it is very questionable whether any of them are in fact natives of the old world. It is to be observed, however, that there are a considerable number of species of the genus Ophiusa found on the continent of Europe.

PHYTOMETRA LUDICRA (Hübner?), Haworth; Stephens (Ophiusa l.); Wood, Ind. Ent., pl. 54, f. 53. Closely allied to O. lusoria; fore wings brown and speckled, with a dot and a short line in the middle black, and two obsolete strigæ towards the extremity of the wing; hind wings brown, In Mr. Swainson's cabinet. Locality unknown. Expansion of fore wings 1⅔ inch.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PHYTOMETRA CRASSIUSCULA, Haworth; Stephens (Ophiusa cr.); Wood, Ind. Ent., pl. 17, fig. 436. Expansion of fore wings 1⅓ inch; grey-brown, with two darker, broad, nearly straight fasciæ across the fore wings, with a small central dark dot, and a short black streak near the tip of the costa, formed of triangular dots. This is common in North America, whence I have received several specimens. Mr. Stephens's specimen, stated by him to have been captured in the north of England, was, I am informed by Mr. H. Doubleday, obtained from Mr. Weaver, who had it from some dealer in the north.

PHYTOMETRA GRANDIRENA, Haworth; Stephens (Ophiusa gr.); has the fore wings blackish-grey, with two oblique divaricating pale fasciæ, between which is a large black kidney-shaped spot; hind wings pitchy-brown, with a pale line at the base and apex, and a large central spot. Described by Mr. Haworth from a specimen in Dr. Leach's collection, stated to have been caught at Bristol, and two others from Georgia in North America; whence the indigenousness of the former individual is very questionable.

PHALÆNA NOCTUA LEUCOMELAS, Haworth; Stephens (Catephia l.); Wood, Ind. Ent., pl. 54, fig. 54; N. alchymista, Hb.; N. convergens, Fab.; Anophia leucomelas, Guénée. Fore wings blackish-brown, with black waves, and a large white spot; hind wings white at the base, with a broad black border. One or two specimens in the old collections were thus named; but one of these, now in Mr. Bentley's collection, is, as Mr. H. Doubleday informs us, quite distinct from the Linnæan leucomelas, and in fact belongs to a group which is purely American in its geographical range.

CATEPHIA TRIFASCIATA, Stephens; Wood, Ind. Ent., pl. 17, fig 437; expands 1⅝ inch in the fore wings, which are glaucous ashy, with three brownish fasciæ; the hind wings brown, with the margin darker, and two pale strigæ. This is also, most probably, a North American species. Mr. Stephens received his specimen from Mr. Kirby, who is said to have taken it at Barham, in Suffolk.

DESCRIPTION OF PLATE LV.

INSECTS.—Fig. 1. Mormo Maura (the old lady, or great brown bar). 2. The Caterpillar.
„ Fig. 3. Catocala Fraxini (the Clifden nonpareil). 4. The Caterpillar.
„ Fig. 5. Catocala Nupta (the red underwing).
„ Fig. 6. Catocala Elocata.

PLANT.—Fig. 7. Alnus glutinosa (the common alder).

C. Fraxini is from the beautiful specimen recently captured by Mr. S. Stevens; the others are from the cabinet of Mr. Bentley, with the exception of Elocata, from a foreign specimen in the British Museum, there being no well-authenticated British specimen. The Caterpillar of Maura is from Hübner, that of Fraxini from the beautiful figure of Sepp. H. N. H.

MORMO, OCHSENHEIMER. MANIA, P. TREITSCHKE.

I have already alluded to the relation which exists between Noctua maura, L., the type of the present group, and N. typica; and, now that figures of the larvæ of both species are before the student, it will be at once perceived that the distinction between the former and the Catocalæ is much greater than that between the two first-mentioned insects. M. Maura differs also entirely in its habits from the Catocalæ, entering houses, and flying by night, whilst the Catocalæ are day-fliers. Mormo has the palpi elevated, with the terminal joint distinct and ovate-conic. The thorax and abdomen crested, the extremity of the latter not conical; the wings deflexed when at rest, forming a triangle, with the margins crenated; the fore wings short, broad, and stigmatiferous; whilst the larva is naked and cylindrical, and marked with dark oblique stripes, and with sixteen feet.

SPECIES 1.—MORMO MAURA. Plate LV., Fig. 1, 2.

Synonymes.—*Phalæna Noctua maura*, Linnæus; Hübner; Haworth; Donovan, 7, pl. 30, f. 1; Harris's Exposition, pl. 1, fig. a, b; Stephens; Wood, Ind. Ent., pl. 17, fig. 438. *Noctua Lemur*, Hufnagle.

This conspicuous insect measures from 2⅔ to 3 inches in the expansion of the fore wings, which are of a dark brown or grey-brown colour, and very shining; the costa with seven small black conical patches, followed towards the tip by three white specks; the base of the wing is varied by shining black patches, followed by a very broad black bar, occupying the middle of the wing, and extending nearly to the costa, in which are placed the two ordinary stigmata, which are distinct, with pale edges; the apical portion of the wing is paler, having a broad, dark, irregularly-dentate striga, running nearly parallel with the apical margin, and shaded off inwardly into the ground-colour of the wings; the hind wings are dark brown, with a slender pale fascia running obliquely across them, and extending nearly to the anal angle. On the under side they recall to mind the under side of the Camberwell Beauty butterfly, in the pale margin of all the wings. The caterpillar is dark brown on the back, with a slender pale line, the sides prettily marbled with dark and light markings; the spiracles orange. It feeds on lettuce and other low-growing plants, but occasionally is found on trees; it forms a cocoon of silk and leaves, or moss, and the chrysalis is powdered with a purplish bloom, as in the Catocalæ. The perfect insect is common and very widely distributed, appearing about the end of July, and entering houses at night, attracted by the lights.

CATOCALA, Schrank.

The splendid species of which this genus is composed are very numerous, inhabiting the moderate northern climes both of the old and new world, and distinguished by the beautiful contrast of the colours of their wings; the hind ones being either blue, orange, or bright red, with black bars, and the upper ones mottled grey or brown, with dentated markings and clouds; the palpi are elevated, with the terminal joint oval and small; the antennæ setaceous, and alike in both sexes; the abdomen attenuated at the tip, and tufted on the back. The caterpillars half-loopers, very flat on the under side, with the sides fringed with fine hairs, and sixteen-footed; they feed upon the leaves of trees, on the twigs of which they lie close when at rest, their colours so closely resembling those of the bark as to render them scarcely perceptible; the chrysalis is powdered with a purple bloom, and is enclosed in a cocoon formed of leaves.

SPECIES 1.—CATOCALA FRAXINI. Plate LV., Fig. 3, 4.

Synonyme.—*Phalæna Noctua Fraxini*, Linnæus; Hübner; Haworth; Donovan, 5, pl. 171, 172; Wilkes, pl. 90; Harris, Aurelian, pl. 31, fig. a—e; Stephens; Wood, Ind. Ent., pl. 17, fig. 439.

This, the most splendid of European Noctuidæ, measures about 4 inches in the expansion of the fore wings, which are ashy-coloured, with whitish and brown clouds, and flexuous strigæ; the hind wings black, with a bar of pale blue beyond the middle. The caterpillar is ashy, irrorated with black; it feeds on poplar, ash, elm, and other trees, and the moth appears in the autumn. It is a rare, although very widely-dispersed species. A very fine specimen was taken at the beginning of September last, by S. Stevens, Esq., in his garden at Hammersmith, attracted by the sugar daubed upon fruit-trees, and captured at night by means of a lantern. Other specimens have also occurred near London; likewise near Birch Wood, at Shalford, near Guildford, near Beverley, Scarborough, and Holderness, in Yorkshire; near Lowestoft, in Suffolk, by G. R. Waterhouse, Esq.; also in Essex, and at Chichester, attracted by a bottle of sweets, placed to destroy wasps, near wall-fruit trees, as I am informed by Mr. S. Stevens. The first specimen recorded as captured in this country was taken at Clifden in

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Buckinghamshire, in July, having just come out of the chrysalis, and in the act of drying its wings, whence the ordinary English name of this species.

SPECIES 2.—CATOCALA NUPTA. PLATE LV., FIG. 5.

SYNONYMES.—*Phalæna Noctua Nupta*, Linnæus; Hübner; Haworth; Donovan, 7, pl. 224; Albin, pl. 80, fig. a—d; Wilkes, pl. 10, fig. 7; Stephens; Wood, Ind. Ent., pl. 17, fig. 440.

Phalæna pacta, Harris, Aurelian, pl. 18, fig. g—m (but not of Linnæus); Wilkes, pl. 37.

Noctua concubina, Borkhausen.

This is the most abundant species in the genus, measuring 3½ inches in the expanse of the fore wings, which are of a grey colour, thickly irrorated with dusky scales, forming clouds; the four ordinary strigæ are present and much dentated, being of a paler colour, with dark edges; the space between the second and third is very broad; the anterior stigma replaced by a whitish patch; the outer stigma black, with a light border, behind which is a round patch, with a dark margin; the apical margin with a row of small black arches. The hind wings bright scarlet, with an irregular, curved, black bar, extending nearly across the middle of the wing, and a broad apical fimbria; cilia white.

The caterpillar is ashy, with dark and shady lines, and with luteous spots and streaks; the cilia above the feet white; it feeds on sallows and willows, and the moths are found flying by day, settling on the trunks of those trees, palings, etc., about the beginning of August, flying off on being approached, with the greatest activity.

PHALÆNA NOCTUA PACTA, Linnæus; as noticed in the Synonymes, has been incorrectly introduced amongst our English moths, in mistake for C. nupta.

SPECIES 3.—CATOCALA ELOCATA. PLATE LV., FIG. 6.

SYNONYMES.—*Noctua elocata*, Esper; Ochsenheimer; Curtis, Brit. Ent., pl. 217; Stephens; Wood, Ind. Ent., pl. 54, fig. 55.

Noctua nupta, Fabricius.

Noctua marita, Hübner.

Noctua uxor, Hübner.

This species measures 3½ inches in the expanse of the fore wings, which are of a darker, more olive colour than in C. nupta, the strigæ being more darkly edged, whilst the stigmatic markings are more obscure, and the apical row of dots are rounded; the hind wings have the red colour less bright than in Nupta; the black central fascia is more regularly rounded, broader, and extending to the anal angle. A single specimen of this insect was in the late Mr. Blunt's collection, but Mr. Stephens states that it was "obtained direct from Oporto." The early volumes of the Magazine of Natural History contain some controversial papers on this subject. It is omitted from the list of British Noctuidæ by Mr. H. Doubleday.

DESCRIPTION OF PLATE LVI.

INSECTS.—Fig. 1. Catocala Sponsa (the dark crimson underwing). 2. The Caterpillar.
" Fig. 3. Catocala Promissa (the light crimson underwing). 15. The Caterpillar.
" Fig. 4. Catocala Conjuncta (the lesser crimson underwing).
" Fig. 5. Brepha Parthenias (the orange underwing). 6. The Caterpillar.
" Fig. 7. Brepha Notha (the light orange underwing). 8. The Female. 9. The Caterpillar.
" Fig. 10. Euclidia Glyphica (the Burnet).
" Fig. 11. Euclidia Mi (the Shipton). 12. The Caterpillar.

PLANT.—Fig. 13. Quercus pedunculata (common oak).

The whole of the insects in this plate are from the rich cabinet of Mr. Bentley. The caterpillars are from Hübner; that of Sponsa slightly altered to express more clearly the flatness of the under side, and its close manner of lying upon a branch—characters common to the larvæ of all the red underwings. H. N. H.

SPECIES 4.—CATOCALA SPONSA. PLATE LVI., FIG. 1, 2.

SYNONYMES.—*Phalæna Noctua sponsa*, Linnæus; Hübner; Donovan, 9, pl. 324; Stephens; Haworth; Wood, Ind. Ent., pl. 17, fig. 441, *Phalæna nupta*, Harris, Aurelian, pl. 19, fig. g—l.

This beautiful species measures from 2½ to 3 inches in the expanse of the fore wings, which are pale ashy-brown, with numerous dark, flexuous, and dentated streaks, and brown clouds, with a pale whitish patch in the stigmatic region of the wing; the anterior stigma represented by a J-like mark, and the outer one by a C, very plainly delineated, behind which is a distinct spot, varying in colour, and edged with black; the subapical striga pale, and deeply dentated and margined with black; hind wings bright crimson, with a slender black fascia across the middle, forming two strong angles and a broad black margin, the inner edge of which corresponds with the angles of the central striga; cilia dark; the abdomen is ashy-brown. The caterpillar is light ash, with brown markings and a bluish head, and with several of the segments tubercled; it feeds on the oak, and the moth appears in June and July, and occurs in some profusion on the stumps of the oaks in the New Forest; also taken in the woods and parks round London. From Harris's figure of the larva, and the angulated striga of the hind wings, it is evident that he intended his drawing for this, and not the next species.

SPECIES 5.—CATOCALA PROMISSA. PLATE LVI., FIG. 3, 15.

SYNONYMES.—*Noctua promissa*, Wien. Verz.; Fabricius; Hübner; Haworth; Stephens; Wood, Ind. Ent., pl. 17. fig. 442. | *Phalæna nupta*, Wilkes, pl. 68. *Noctua Mneste*, Hübner.

This species is ordinarily rather smaller than the preceding, measuring from 2½ to 2⅝ inches in the expansion of the fore wings, which are of a paler colour than in C. sponsa, being ashy, varied with brown, and ornamented with numerous dark, deeply-dentated strigæ; the middle of the wing without the pale patch; the hind wings coccineous, with a flexuous but scarcely angulated black fascia across them, rather beyond the middle, and a deep border of the same colour, of which the inner margin runs parallel with the fascia; cilia pale ashy, clouded with brown; the abdomen ashy. The caterpillar is bluish-ash, with numerous irregular black dots, and fimbriated above the feet. It feeds on oak, on the trunks of which trees the moth is found about the beginning of July. Taken near Brockenhurst, in the New Forest, and Richmond Park.

SPECIES 6.—CATOCALA CONJUNCTA. PLATE LVI., FIG. 4.

SYNONYMES.—*Noctua conjuncta*, Esper; Treitschke; Godart; Stephens; Wood, Ind., Ent., pl. 17, fig. 443. *Noctua conjuga*, Hübner; Haworth.

This species is very closely allied to the two preceding, measuring about 2¼ inches, or somewhat less, in the expanse of the fore wings, which are ashy-brown, varied with darker clouds and dentate strigæ, and a rather pale patch in the whitish central fascia; the hind wings coccineous, with a nearly straight, black, central fascia abbreviated towards the anal angle, and a broad black margin, of which the inner edge is rather more sinuated than the preceding striga, and having a whitish patch on the margin near the tip of the wing; abdomen ashy-brown. Mr. Stephens states that a specimen has been taken near Dulwich; two other specimens were in ancient British collections of which the localities are unknown.

BREPHA, HÜBNER. BREPHOS, OCHSENHEIMER.

The few species of which this genus is composed present a remarkable discrepancy in the structure of the antennæ, being strongly bipectinated in the males of B. Parthenias, whilst they are simple in the same sex of B. notha; and yet the females of these two species are so much alike that it is very difficult to perceive a

distinction between them; the labial palpi are very short, and differ from those of all the previously-described genera of Noctuidæ in being thickly clothed with long diverging hairs; the wings, when at rest, are horizontal; the hind ones brilliantly coloured; the body and abdomen are slender. The caterpillars are slender, cylindrical, sixteen-footed, the two anterior pairs of the pro-legs being small. In their motions they closely resemble those of the following family; like them, also, when alarmed they drop from the twigs, suspending themselves by a thread spun from the mouth.

SPECIES 1.—BREPHA PARTHENIAS. Plate LVI., Fig. 5, 6.

Synonymes.—*Phalæna Noctua Parthenias*, Linnæus; Ochsenheimer; Haworth; Donovan, 7, pl. 246, fig. 1; Harris, Aurelian, pl. 35, fig. 1; Stephens; Wood, Ind. Ent., pl. 17, fig. 444.
Noctua Notha, Hübner.
Bombyx vidua, Wien. Verz.; Fabricius.

This species measures from 1 to $1\frac{1}{3}$ inch in the expansion of the fore wings, which are brown with several rather obsolete, ashy, or whitish strigæ, variable in intensity, of which two towards the apex are more distinct, arising from two paler marks on the costa; and preceding these is a rather indistinct paler stigma, with a dusky margin. The hind wings are dull orange, with the inner and apical margins (the latter dentated) and a slender interrupted striga in the middle black; the male has the antennæ bipectinated, but those of the females are simple. On the under side this species is distinguished by having the dull colour which suffuses the orange at the base of the fore wings extending to the costal spot in the middle; the tips are entirely black, and the black on the hind wings extends beyond the middle, from the inner margin. The caterpillar is yellowish-green, with a dark greyish-black line down each side; it feeds on poplars and willows, and the moth appears at the end of March, flying about the blossoms of willows. It is not very uncommon in woods, being a widely-dispersed species.

Brepha puella (Esper; Treitschke; Stephens; Wood, Ind. Ent., pl. 17, fig 445; Noctua spuria, Hübner) is in the British Museum collection, supposed to be from Dr. Lettsom's cabinet, and of unknown habitat. The male has pectinated antennæ, but the fore wings are nearly of an uniform brown, and the hind wings are luteous, with dark markings nearly as in the preceding species.

SPECIES 2.—BREPHA NOTHA. Plate LVI., Fig. 7, 8, 9.

Synonymes.—*Hemigeometra Notha*, Haworth; Ochsenheimer; Curtis, Brit. Ent., pl. 121; Stephens; Wood, Ind. Ent., pl. 446.
Noctua Parthenias, Hübner.

This species measures about $1\frac{1}{4}$ inch in the expanse of the fore wings, which are dirty ferruginous, with the base dark, terminated by an irregular, slender, black, transverse fascia; beyond the middle is a pale ochreous bar, attenuated towards the hind margin, edged with a black curved line, and enclosing a small round black spot, with the middle whitish; the apical portion with a slender, dentated, black line, terminating in a black dot on the costa; the hind wings bright orange, with the inner margin, a dentated apical margin, and central, rather slender lunule of black; the antennæ in both sexes are simple and nearly alike; beneath, the fore wings are dull-coloured at the base of the orange, the tips pale, and the hind wings have the dark markings of the inner margin not extended beyond the middle. The caterpillar is green, with a yellow line down the back, and grey lateral stripes; it feeds on the birch, oak, etc., and the moth appears towards the beginning of March. It is rarer than the preceding species, and is found in woods, hovering over the sallow blossoms. It has been taken in the woods round London, also in Yorkshire and Essex (Entomologist, p. 374).

EUCLIDIA, Ochsenheimer.

This genus has much of the habit of the preceding, but differs in the palpi, which are of moderate size, and bent upwards, with the terminal joint attenuated; the antennæ simple; the fore wings form a triangle when closed, and the larvæ are very long, slender, and vermiform, twisting about in all directions, and having only twelve feet. Mr. Stephens, indeed, described them as sixteen-footed, which Mr. Curtis attempted to correct, by stating that they possess fourteen feet, ingeniously throwing a leaf over that portion of his figure of the larva, which would have shown his own error. The head of the caterpillar is of large size; they feed on low-growing plants. These insects fly in the afternoon sunbeams, and are very active; a peculiarity indicated by the spines on the four posterior tibiæ,* which are analogous to those on the feet of the Phryganiidæ.

SPECIES 1.—EUCLIDIA GLYPHICA. Plate LVI., Fig. 10.

Synonyme.—*Phalæna Noctua glyphica*, Linnæus; Haworth; Stephens; Curtis, Brit. Ent., pl. 659; Wood, Ind. Ent., 17, fig. 447.

This species measures about 1¼ inch in the expanse of the fore wings, which are glaucous brown, with two converging brown bars running across the middle, and a brown patch near the extremity of the costa; the hind wings dull orange, with the veins, the inner and apical margins irregularly, and an abbreviated slender striga beyond the middle dark brown. The caterpillar is rusty grey, with brown dorsal and lateral streaks, the latter with black dots on each side. It feeds on species of Verbascum, Trifolium, etc., and the moth appears about the end of June, frequenting the sides of clover-fields near woods, and being rather common and dispersed all over the kingdom.

SPECIES 2.—EUCLIDIA MI. Plate LVI., Fig. 11, 12.

Synonyme.—*Phalæna Noctua Mi*, Linnæus; Treitschke; Hübner; Haworth; Stephens; Wood, Ind. Ent., pl. 17, fig. 448; Harris, Aurelian, pl. 41, fig. S.

This species measures rather less than 1¼ inch in the expanse of the fore wings, which are of a blackish-brown colour, with numerous buffish-white, sinuated lines, giving the wing the appearance of being mapped out; the hind wings are also blackish-brown, with two rather large oval patches near the centre, followed by a sinuated slender fascia, and an irregular submarginal row of spots, all of buffish-white. The caterpillar is dirty white, with a dark line down the back, and a pale one on each side. It feeds on Medicago falcata, as well as a kind of grass, on which it was reared by Lyonnet, whose posthumous researches contain an excellent memoir of this curious species. The moth appears at the end of May and in June, frequenting clover-fields, and being a widely-dispersed and abundant species.

Noctua triquetra (Wien. Verz.; Fabricius; Hübner; Stephens; Wood, Ind. Ent., pl. 54, fig. 57; Noctua fortificata, Fabricius; Pyralis fascialis, Villars), a native of Hungary and Italy, was erroneously introduced into our British lists by Mr. Samouelle, in mistake for the preceding species. It has the fore wings ashy, with black and brown triangular spots; and the hind wings yellowish, with a brown fascia and apical margins.

* Mr. Curtis has overlooked these spines in the hind feet, although he figures them in the middle tibiæ; they exist in both our English species.

ERRATA AND CORRIGENDA.

P. 14. *lin. ult.* With reference to the capture of Sphinx Pinastri in Ravelston Wood, near Edinburgh, positively denied by Mr. Duncan, Mr. Stephens has been so kind as to show me the following entry by Dr. Leach in his manuscripts written before he was appointed naturalist to the British Museum:—In Rivelstone Wood, a me ipso semel lectus. Dom. J. Wilson, Collegii janitor, bis lexit prope Edinburgh." 1811.

P. 16, line 17—*for* "lineata" *read* "Livornica."

— line 23—"Species 5" *for* "Species 1."

P. 24, line 7—*for* "fire spotted" *read* "five spotted."

P. 31.—"The two Anthroceræ (omitted in Plate 6, and represented in Plate 8) are from the collection of Mr. Stephens, who considers them established as distinct British species; he, however, differs from Dr. Becker, of Wiesbaden, who is decidedly of opinion, from all he has seen, that we have only two species—namely, A. Filipendulæ and A. Loti. In the description of Plate 6, I mentioned my suspicion that some mistake existed with respect to the caterpillars of A. Filipendulæ or A. Loti, which has been the means of furnishing me with the following satisfactory remarks, communicated by the Rev. W. T. Bree, which prove that my suspicion was not unfounded. The larva of A. Filipendulæ, as figured by Hübner (my fig. 12, plate 6), and described by others on his authority, being totally unlike nature—Mr. Bree says, "The caterpillars of A. Filipendulæ and A. Loti are somewhat onisciform, but not so short and thick as your figure of Ino statices, yet exceedingly unlike in form to your figure of Filipendulæ. The two species occur in this neighbourhood (near Coventry), but in different localities, Loti being found in heathy bogs, and Filipendulæ in low meadows and grassy woods; occasionally I have met with specimens of each in the locality of the other, but this was not usual, which tended to convince me, among other circumstances, that they were distinct species. This view of the distinctness of even these two species does not, however, seem fully borne out by the appearance of the larvæ; for Mr. Bree goes on to state, 'I have often seen the caterpillars of each, and though I never compared them accurately, side by side, together, yet I can safely say that there is no very obvious difference between them;' and says that the rough figures in Harris's Aurelian, and in Wilkes, are evidently the true caterpillar, and not by any means bad representations." (H. N. H.)

P. 50, line 9—Zeuzera Arundinis was taken by Mr. H. Doubleday at Whittlesea Mere, and not in Epping Forest.

P. 67—*add* "SPECIES 4, NOTODONTA TRITOPHUS.

"SYN.—*Bombyx tritophus*, Fabr.; Esper.; Ochsenheimer; Godart; Hübner (text); Douglas, in Entomol., p. 385.
Bombyx torva, Hübner, fig. 27, but not of Ochsenheimer.

"Closely allied to Notodonta zic-zac, with the fore wings clouded with brown, and with somewhat obsolete waved dusky strigæ, with a central ferruginous lunule, edged with white; hind wings with a stripe of brown on the anal edge. Caterpillar 'greenish-grey coloured, having three prominences on the back,' very much resembling that of N. zic-zac. The larva taken in July, 1842, by J. W. Douglas, Esq., from an aspen-tree on the coast of Essex. It formed a slight covering between two leaves in the collecting-box, and appeared in the perfect state on the 10th August."

P. 90, line 11—*for* "are" *read* "is."

P. 104, line 4—*for* "rosea" *read* "miniata."

P. 114.—The Synonymes of several of the species of the larger genera placed at the commencement of the family Noctuidæ, especially Agrotis and Graphiphora, are still extremely confused. In describing these groups I received great assistance from Messrs. H. Doubleday and Bentley, to whom my best thanks are due for their kind attentions. I need not refer to any particular passages in proof of the valuable aid they have afforded to this work, because it has been my desire throughout (and I believe there is not a single page which does not prove this) to render to each his due. Since the portions of the work referring to these genera were published, several papers have appeared in the "Entomologist," upon the classification and nomenclature of this difficult family, to which the reader is referred. The task of settling the nomenclature of many of these species, and of determining the strict identity of many supposed English species with those of Continental authors, has yet to be accomplished; but the laborious exertions of the gentlemen above named, with several others equally assiduous, will go far to remove many of the doubts that still

remain. Greater attention ought unquestionably to be devoted to the rearing of the insects from the larva state, although the subterranean habits of many of the species present great obstacles. Many larvæ feed only by night, and several French collectors of the present day have met with great success by searching for the caterpillars by night with a lamp.

P. 111.—Lytæa albimacula, omitted in Mr. H. Doubleday's list of British Noctuæ (Entom. 378).

P. 114.—Chersotis agathina, Boisduval (referred to in p. 110, as Agrotis agathina, Curt., sugg.), is given by Mr. Doubleday as distinct, and introduced into the genus Agrotis from Boisduval's note; its synonymy appears very confused. (Index Eur. Lep., p. 104.)

P. 117.—Agrotis annexa, has also occurred at Worcester, according to Mr. Bentley.

P. 121.—Agrotis sagittifera is omitted as British by Mr. H. Doubleday.

P. 122.—Agrotis fumosa is regarded by Guénée and Mr. H. Doubleday as a distinct species.

P. 123.—Agrotis pascuea, Curt., is the signifera of Continental authors, as I am informed by Mr. Stephens.

P. 124.—Agrotis nebulosa, Stephens, is given by Mr. H. Doubleday as a variety of N. Ripæ, Hübner.

P. 126.—Graphiphora subrosea was accidentally omitted in Mr. H. Doubleday's list.

P. 127.—Graphiphora crassa is the Noctua ravida, Hübner, and has been reared at the beginning of July, by Mr. H. Doubleday, from a larva found at night on a sallow, in company with the larvæ of other species of Graphiphora.

P. 129.—We are informed by Mr. H. Doubleday that the Graphiphora tristigma of Stephens is not the G. tristigma of Ochsenheimer, but is apparently identical with the G. rhomboidea, Ochs.

P. 135.—Noctua subplumbea, Haw., is stated by Mr. Doubleday to be distinct from Orthosia gracilis.

P. 147.—The Rev. F. Lockey informs me that many specimens of Grammesia bilinea were taken a few years ago at Swanswick, near Bath.

P. 210—Species 6, Xanthia gilvago. [fulvago).

Syn.—*Noctua gilvago*, Fabricius; Hübner; Esper; Treitschke (but not of Haworth, which is a variety of X.
Noctua ocellaris, Borkhausen. *Noctua palleago*, Hübner; Treitschke (variety).

This species measures nearly 1½ inch in the expanse of the fore wings, which are of a rather dull orange colour, the central portion occupied by a greyish lead-coloured patch, in which the stigmata are placed, the anterior rounded, and the outer one, with the hind part, dark-coloured; towards the base of the wing, and beyond the stigmata, are the strigæ rather indistinctly traced, with a subapical row of black dots, followed by a marginal series of dusky spots, the hind wings whitish, with a submarginal dusky streak, more visible towards the anal angle. The true gilvago is now, for the first time, introduced into the British lists, on the authority of J. F. Stephens, Esq., who has received it from the neighbourhood of Doncaster, where it was captured last September in some plenty, by the Rev. Mr. Preston.

Pl. 53, figs. 19, 20.—Mr. Stephens informs me that the insect represented in figure 20 is the true Hemigeometra minuta of Haworth, and that that represented in figure 19 is a different species, to which the name of minuta has been misapplied, in the collection of the British Museum, it being the Noctua Paula of Hübner.

P. 214, Note*.—Mr. Edward Doubleday informs me that he had determined Nonagria crassicornis to be identical with Leucania Bathyerga before sending the specimens to M. Pierret.

P. 216.—Mr. Samuel Stevens first apprised me, on the authority of Mr. E. Doubleday, that Nonagria Vectis, Curt., "is like Straminea," Treitschke, as I find by a note which I had mislaid at the time of writing the description of that insect.

P. 223.—Cucullia Lychnitis is in the cabinet of Mr. Stephens.

P. 228.—Cucullia Prenanthis is in Mr. Stephens's cabinet, from Riddlesdown, near Croydon, and from Birch Wood Kent.

Heliothis Ononis is given by Boisduval, in his Eur. Lepid. Ind. Meth., as a native of England, but we are not aware of any specimen known to have been captured in this country.

ALPHABETICAL LIST OF THE NAMES

THE FAMILIES AND GENERA OF MOTHS DESCRIBED IN THE PRESENT VOLUME.

OBS.—*The names printed in Capitals, are those of the Families; those in ordinary Roman characters, are those of the Genera adopted; and those in the like type, but enclosed in parentheses, are the Synonymical names of the Genera, the introduction of which it has been thought would be of material service in facilitating references to the text. Where two or more numbers to pages are given, those enclosed in parentheses are used synonymically.*

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ALPHABETICAL LIST

OF THE MORE

ORDINARY ENGLISH NAMES OF MOTHS DESCRIBED IN THE PRESENT VOLUME.

NOTE.—*As many English names are employed almost in a generical sense, it has not been thought necessary to introduce the name of the various individual species which bear such designations into this list; for instance, there are several kinds of Ermine moths, as the large Ermine, Water Ermine, etc.; in such cases, the generical name* Ermine *moth must be sought for, and not the* specific *ones of* Water *Ermine,* Large *Ermine, etc. As the English names are often omitted in the descriptive portion of the work (being in such cases introduced into the descriptions of the Plates), it will often be necessary, as in the case of the Ermine moths, described in pages* 91 *and* 92, *to refer to the description of the Plate in which they are contained. Thus we find, in page* 91, *the name Ermine moths applied generically to the species of Spilosoma; but if any particular species of Ermine moths be sought for, reference must be had to the description of Plate* 18 *(in which they are figured), in page* 88, *the description of the plates being always found within a few pages preceding that of the insects figured therein.*

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THE END.

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